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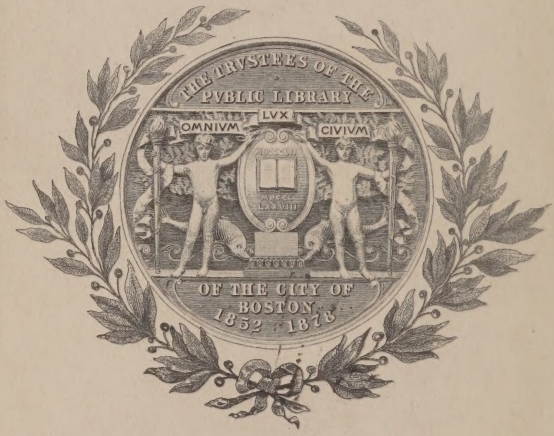
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FROM BLOMIDON TO SMOKY

AND OTHER PAPERS

BY

FRANK BOLLES

SECOND EDITION.

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BOSTON AND NEW YORK
HOUGHTON, MIFFLIN AND COMPANY
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NOTE.

THE following papers, with the exception of the first four, which are Mr. Bolles's latest work, are arranged in the order in which they were written and first published in different periodicals between the years 1890 and 1894.

They are now reprinted in their original form, although this involves a certain amount of repetition which would doubtless have been avoided had Mr. Bolles himself revised them.

Barred Owls in Captivity and the two papers that follow appeared originally in "The Auk," Bird Traits in "The New England Magazine," the next two as well as the first four in "The Atlantic Monthly," Ways of the Owl and the two closing papers in "The Popular Science Monthly."

E. Q. B.

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FROM BLOMIDON TO SMOKY.

Against the Bay of Fundy, with its fogs and turbulent waters, Nova Scotia presents a bold front of bastion and moat combined. The bastion is called North Mountain, and is a well-wooded ridge running parallel to the southeast shore of the Bay of Fundy for nearly its entire length. The moat consists of St. Mary's Bay, the Annapolis Basin, and the Basin of Minas, and their tributary rivers, all lying within the line of North Mountain. Parallel with both bastion and moat, and presiding over the well-tilled fields which border the several basins, is South Mountain, from whose height can be obtained the finest views of the land of Evangeline, and its impressive central figure, the spruce-covered, storm-haunted Blomidon.

When we landed at Yarmouth, far down near the southern tip of Nova Scotia, and saw the monotonous country which is characteristic of that part of the province, something very much like gloom settled upon our spirits. We took an early morning train, and started eastward and northward towards Blomidon. Rain, miles

of larch and spruce swamp, burned woodland given up to tangles of fireweed and briers, and cheerless, rock-rimmed ponds in low woods haunted us until we reached Digby. True, our escape from the railway at Meteghan station, and our five hours with Mr. Sheehan, the royal mail carrier and hospitable hotel keeper, brightened us somewhat; but there was nothing at the railway to tell us of the quaint French settlement of Meteghan which lay concealed, beyond ridge and woods, on the pleasant shores of St. Mary's Bay. As we left Digby, late in the afternoon of this first long day in Nova Scotia, the clouds broke, the setting sun struggled for the mastery of the sky, and all the heavens were filled with shifting masses of storm and charging columns of golden light. The bank of vapor which had rested upon the Annapolis Basin at North Mountain — vapor brewed, no doubt, in the Bay of Fundy — suddenly lifted, and we saw under it not only the vivid greens of forest and field on the mountain, but Digby Gut, a narrow, steep-walled cleft in the mountain leading straight out to the golden glory of the bay of storms. Through that rift in the hill romance and the French had sailed in as long ago as the first years of the seventeenth century; and though the French sailed out again, romance remained behind to dwell forever in Port Royal's placid basin.

As our train neared Port Royal, long ago called Annapolis, and rolled along the southern shore of the basin, the beauty of the scene increased, thanks largely to the brilliant effects of cloud-masses and an ardent setting sun. The mountain seemed high, its top not being clearly defined, and the wild scenery near Bear River, where the train passes over a high curved trestle, became doubly striking in the sunset lights. Every few rods a blue heron flew from the sands and flapped away from the train. Marvelous flocks of peep rose, careened, flashing like silver, wheeled, and alighted once more on good feeding-ground. Shadows nestled amongst the weirs running out at short intervals from the shore; darkness began to gather in the valleys and the woods, and soon we reached Annapolis with its ancient earthworks, and found something akin to comfort in its best but unpretentious inn.

It was on the afternoon of the next day, our second on the peninsula, that I saw Blomidon, — saw it first from the Kentville slopes, and again, after we had followed down the dashing, dancing Gaspereaux for several miles, from the heights above Wolfville. The Gaspereaux Valley had been charming by reason of its wooded hillsides, in parts holding the river closely between dark banks of spruce and fir, but later

giving it freer range through well-tilled meadows and undulating fields. Evening, heralded by rolling masses of dark clouds, seemed to be upon us, as our horses slowly climbed the steep slope of the Gaspereaux back of Wolfville. The air grew cold, and when we reached the crest of the ridge a strong wind wrestled with us, and carried a chill from Fundy to the very marrow of our bones. Then it was that, gaining the edge of the northern slope, we suddenly saw the marvelous panorama of the Cornwallis Valley, North Mountain, Blomidon, the Basin of Minas, the Acadian dike lands including Grand Pré, and the mouth of the Gaspereaux, spread before us under the sunset lights and the emphatic contrasts of speeding wind clouds.

The tide was out, and miles of basin bottom lay red and shining in the sunlight. The dike lands were intensely green, the sands, or mud, all shades of terra cotta, the shallows strange tones of purple, and the deeper waters varying shades of blue. Color ran riot in meadow, mud, and bay. Above and beyond all, directly in front of us, miles away, at the extremity of a grand sweep of shore which curved towards it from our left, was a dark red bluff crowned with evergreens. Its profile was commanding. From the edge of its forest it fell one quarter of the way to the sea in a line perfectly perpen-

dicular. Then, relenting a little, the line sloped to the waves at a gentler angle, but one still too steep for human foot to ascend. This was Blomidon, simple, majestic, inspiring.

The distant northern shore of the basin was plainly indicated by a line of blue mountains, the Cobequid range, and we knew that between us and its rugged coast-line the mighty, pent-up tides of Fundy raced each day and night into the comparative calm of Minas, and spread themselves there over the red sands and up to the dikes which the Acadian peasants had built round about Grand Pré. After receiving the image of Blomidon into the deepest corners of our memories, we looked next at Grand Pré, and, looking, gave up all previous impressions of it gained from Longfellow's poem. The Grand Pré which he imagined and painted without ever visiting the Gaspereaux country is not the dike land of reality. Both are charming, but around the vast level of green grass which lay below us there were no whispering pines or hemlocks, no suggestion of the primeval forest. To the low undulating or level fields which bordered the Gaspereaux, the Pereaux, the Grand Habitant, and other rivers of this region, the Acadian farmers added by degrees marsh lands naturally swept by the tides, but from which they carefully and permanently ex-

cluded all salt water. Longfellow's picture is of salt meadows flooded annually by the sea, and surrounded by a forest country, romantic in character. We saw forests far away on Blomidon, and back of us in the upper reaches of the Gaspereaux; but near the Basin of Minas and the dike country of Grand Pré the apple-tree and the willow are, in this generation at least, kings among trees. To flood Grand Pré with salt water would be to carry ruin and desolation to its fertile acres, and sorrow to the hearts of its thrifty owners. Its best lands are worth four hundred dollars an acre, and require no enrichment. When the sea floods them, as it occasionally does, owing to the breaking of a dike, three years are required to bring the land back to even fair condition.

The next afternoon a pair of Kentville horses carried us speedily towards Blomidon. We crossed the Grand Habitant or Cornwallis River at Kentville, and then followed the general direction of the shore of the basin until we had crossed in order the Canard, Habitant, and Pereaux rivers, and gained the North Mountain. Striking a ravine in its side, we ascended a well-made road to the summit at a point called "the Look-off." I know of no other hill or mountain which gives the reward that this one does in proportion to the effort required to climb it.

Many a rough White Mountain scramble up three thousand feet yields nothing like the view which this hill affords. The Nova Scotian glories in the fact that from it he can see into seven counties, and count prosperous farms by the score and apple-trees by the hundred thousand.

From the shores of the basin westward through the valley between the North and South Mountain well-tilled farm lands reach towards Annapolis as far as the eye can see. It is a patchwork of which the provinces are and may well be proud; that quilted landscape, with grain and potatoes, orchard and hayfield, feather-stitched in squares by zigzag pole fences. Were this the whole or the essence of the view from the Look-off, it would not be worth writing about, for farm lands by themselves, or with a frame of rounded hills, are neither novel nor inspiring. That which stirs, in this view, is the mingling of Minas Basin, its blue water and dim farther shores, with Grand Pré and the other dike lands and with the red bluffs of Pereaux. The patchwork and hills serve only as contrast, background, filling, to the pronounced features of sparkling sea, bright green meadows cleft from the sea by dikes, terra-cotta sands and bluffs, and the forest-covered ridge leading towards half-concealed Blomidon, the monarch of this gay

and sunlit realm. It was dreamlike to see the tide creeping in over the shining red sand and ooze, and changing their vivid tints by blending with them its own colors to make tones strange both to sea and sand. The wide expanses of mud left bare by the tide told in their own way the story of the Acadian dike builder. No man of the soil could see the riches exposed daily to view without wishing to keep them for his own tillage. Even the man of to-day, who lay beside me on the turf of the Look-off, told of his visions of a new dike many times greater than any that the simple Acadian farmer had built, and which is some day to snatch a million dollars' worth of land from Minas Basin, and make it into a part of the prosperous Nova Scotia of the future. Listening to the dike builder, and wondering at the absence in this exquisite place of the hotels, pushing railways, dainty steamers, and other machinery which at home would long ago have been applied to give this spot to the madding crowd, it suddenly came over me that this was not a part of the United States, but a sleepy corner of Greater Britain. Even the great dike must be built on paper in London before it intrudes on Minas Basin.

The next time that I fully realized Nova Scotia's bondage was two days later, in Halifax

on Sunday morning. It was a warm day at best, but when we had fairly pelted up a narrow street set on the earth at an angle best adapted to tobogganing, and gained the gateway of a chapel yard, all nature seemed melting. The hot air was moved, not by a vulgar breeze, but by the tramp of military men, and by the scampering of women and children who gazed upon the military men, and grew redder in the light reflected from their uniforms. There was morning service in the garrison chapel, and the redcoats were out in force to attend it. They marched lightly, quickly, and with an elastic step pleasant to see. They were good-looking boys, as a rule, and when seated, hundreds strong, in the wooden pews of the chapel, they looked tidy and good enough to be mothers' own boys safe at home in the wayside chapels of the old country. Above them, in the walls, were set a score of marble tablets commemorative of British officers who had died in or near Halifax. The ages of these fallen heroes seemed to range from seventeen to about twenty-four. No wonder England is a power on the earth, when her fighters begin life in childhood, and her statesmen keep on ruling until near fourscore and ten.

The red-coated youths joined heartily in the Church service, singing, responding, and listen-

ing attentively to the sermon, which was manly and direct. A young officer read the lessons, and when a cornet added its ringing tones to the choir the Church militant seemed complete in its equipment. It was when the prayer for the Queen and the Prince of Wales was reached that I suddenly realized the full meaning of the scene which surrounded me. This was a garrison church, owned by a foreign power and occupied by foreign soldiers. These soldiers were not Nova Scotians, but Englishmen, planted here as much to watch the Nova Scotians as to serve any other purpose. I could not help remembering the time, long ago, when Massachusetts dispensed with redcoats, and in the very act of driving them away from her coast gained new life which has animated her to this day. Nova Scotia men are good enough and true enough to defend Nova Scotia soil.

When the redcoats sang "God save the Queen," at the close of their service, I joined with them; but the words I knew, and which I sang as vigorously as prudence and courtesy permitted, made no reference to their distant sovereign. Still, the tune was the same, we were brothers in music, and there was no shadow of unkindness in my feeling towards the manly soldiers as we trooped out of chapel together. While they formed in ranks on the green, I met

and chatted with their commanding officer. Suddenly the twelve o'clock gun was fired from the citadel above us. The general started visibly, but almost at the same moment his betrayal of nervousness was covered by the band, which struck up "Ta-ra-ra, boom de ay," putting springs into the soldiers' heels, and broad grins upon the spectators' faces.

The next day, after a little patient pulling of red tape, I gained admission to the great citadel of Halifax, popularly supposed to be the key to its defenses. The works were in poor repair; the guns in sight were old in style, and not of a calibre to alarm an enemy's ships in the outer harbor; but the equipment was amply sufficient to keep Halifax itself in order, or to deal effectively with an insurgent army attempting to approach the city. Against the attack of a strong foreign enemy the citadel would be of use mainly as a refuge for the women and children of Halifax. The real defenses of the city are earthworks in or near the harbor, and an elaborate system of mines and torpedoes underlying the channel.

The citadel has one unquestioned merit which all the world, red or blue, can enjoy: it gives from its ramparts, or from the open grassy slopes just outside the bastions, an excellent view of Halifax and all its picturesque surroundings.

This view and the winning hospitality of the Halifax people were fresh and bright in our memories as we took the Intercolonial train northward on Tuesday morning. Outside the train, scanty forests, growing over a country which appeared to have been bombarded with rocks, offered no encouragement to an inquisitive gaze. Inside, motley humanity invented many ways of distracting us in more senses than one. Salvationists sat three in a seat and played concertinas; a company of maroons, the big negroes of the country, disported in their best clothes; dozens of young Christian Endeavor delegates hobnobbed together; while some Nova Scotia militia-men, by their calf-like antics, made us think more kindly of the British garrison left behind. If the scenery failed to charm, the names of places did not fail to astonish us. Acadie, Tracadie, Shubenacadie, rang in my ears for days, and so did the less harmonious refrain of Tignish, Antigonish and Merigomish. When I heard of Pugwash the climax seemed attained. It did not seem possible that any swain could go a-courting a girl from Pugwash.

The day wore on. Names became places and faded back to names again, and then it began to rain. It was in the rain that we first saw the hills of Cape Breton looming up on the further side of the Gut of Canso. We had expected to

be impressed by this strait and its bold shores, but its proportions as seen through slowly falling mist were disappointing. Had we not known what it was, it would have seemed undeniably commonplace.

It was about three o'clock on the afternoon of August 1 that we crossed the Strait of Canso and first touched Cape Breton soil. A boy with baskets of freshly picked cultivated strawberries welcomed us to the island. Our mental calendar rolled back from August to June, and we enjoyed those berries as though they were the first of the season. Each berry marked a mile of wet forest scenery, and by the time they were gone we were well on our way to the Bras d'Or lakes. From 6.45 A. M. to 5.15 P. M. is a long day's ride in a Nova Scotia car, and we sighed with relief when the train rolled slowly over the seven-span iron bridge at Grand Narrows, and then slid away up the shore of the Bras d'Or towards Sydney, leaving us to take a funny little steamer for Baddeck.

Cape Breton is shaped a good deal like a lobster's claw open towards the north, and this claw holds in its grasp the grotesquely irregular arm of the sea known as the Bras d'Or lakes. Coming by rail from the Strait of Canso to Grand Narrows, we had given up, or rather avoided, a trip by steamer up the whole length of the Big

Bras d'Or. Had the afternoon been pleasant the voyage would have been charming, for the placid inland sea, with its picturesque shores now close in view, and again below the horizon, is one of the chief beauties of Cape Breton. As the afternoon was shrouded in fine rain, the Big Bras d'Or would have been no more attractive than any other chilly fog-bank, and the voyage through it would have consumed all the remaining hours of the day. As matters stood, we had two hours of daylight before us; the rain had almost ceased; an occasional gleam of golden light wandered over the shores of the Little Bras d'Or; and we were about to embark on a steamer which would take us through a portion of the lakes where both of the hilly and picturesque shores would be uninterruptedly in sight.

Had we seen this charming landscape immediately after bidding farewell to Chocorua, it would have failed to make the strong impression upon us which as a matter of fact it did produce. So much of Nova Scotia between Yarmouth and Halifax, and so nearly the whole of the country between Halifax and Grand Narrows, had been of a kind which every one sleeps through or scowls at in the States that the Bras d'Or was a paradise in comparison: a lake, yet the sea with its restless jellyfish; the sea, yet a land-locked basin surrounded by graceful hills, trim farm lands, and

dark forests of spruce and balsam. Many of the hills, rising from the water with resolute lines, wore the dignity of mountains; and so perfect were their proportions that bays only half a mile in length often seemed like far-reaching thoroughfares worthy of a voyager's exploration. Gradually the Grand Narrows bridge faded away, until it looked like a line of tatting work against the gray sky. Then the most distant hills northward rose into well-rounded summits, and at last two noble headlands invited us to turn westward between them, and to approach Baddeck, masked by an island, spruce-grown, heron-haunted, and capped by a tiny lighthouse whose gleaming eye now emphasized the gathering gloom.

The traveler who expects anything picturesque in an American village, town, or city, whether it be seen from the sea, a lake, a plain, or a hilltop, will in nine cases out of ten be wholly disappointed. Box-shaped wooden warehouses, shops, dwellings, and churches, whether arranged in parallelograms or hurled together in true Marblehead fashion, whether painted white, pink, green, yellow, or red, or not painted at all, generally lack the power of pleasing the eye. They are cheap, comfortless in appearance, temporary in nature, and essentially vulgar in design. Baddeck, as we anticipated, consisted of the usual conglomeration of wooden buildings, rickety

wharves, and country roads; and when we crept round the island, and saw it lank and gawky before us, we felt as though we had seen it many times before. It made for us a good point of departure, and as such we used it, for a few walks into its thickets after birds and plants, and for long trips to the Margaree rivers, and northward to Cape Smoky.

We took our first walk that evening, soon after landing and getting settled at the Dunlops'. During that walk we learned several distinguishing characteristics of Baddeck. In the first place, Baddeck's streets are not lighted. In the second place, what in the darkness appear to be sidewalks are only plank coverings above deep gutters or brook beds which border the way; and as the continuity of this platform depends upon the personal whim of the abutter, it is not surprising that when Rory's sidewalk ceased we fell into Torquil's part of the ditch. The soil of Baddeck is so composed of clay and other substances that rain either runs to the Bras d'Or, or stands till heaven takes pity on it and draws it skyward again. The third fact we learned that night was that cows in Baddeck all wear bells, sleep in the highways, and are never allowed inside a fence. Whenever and wherever we turned, a sudden "tinkle-tankle" would show that we had nearly fallen over a prostrate cow: therefore,

after half an hour of darkness, ditches, and cows, we returned to the hotel and its comforts; but all night long the cowbells tinkled through our dreams.

For the Margaree drive we took three days, starting from Baddeck early on Thursday, August 3, in a top buggy behind a six-year-old horse named Jim. The first day we drove twenty-six miles, the second twenty-two, and the third ten, fortunately catching a steamer at Whycocomagh, and so coming back to Baddeck alive, and with Jim still able to feel the whip. We had been told that the Margaree country was entrancing; but when the trip was over we had reached the conclusion, afterward confirmed by a Cape Breton veteran, that salmon had first drawn the husbands to the Margaree and made them enthusiastic about it, and that later, when the wives invaded the region, they had been taught to find consolation in the pretty scenery. In our three days' trip we found but two spots which in the White Mountains would be deemed worthy of special notice. One of these was Loch o' Law, and the other Loch Ainslie. We came to the former near the close of our first day's drive. Worn and weary with flogging Jim, and insisting twice each minute on his return to the middle of the deeply rutted and often dangerously washed road, I had lost all interest in everything save the dim

prospect of food and bed, when suddenly I saw the gleam of water directly before us, and the next moment we came out of the woods upon the shore of a long, narrow lake held close to the heart of lofty hills. Our road followed the western margin of the tarn, and the dark forest which overhung us made premature twilight for us to jog through. Beyond the lake, on its eastern side, three impressive hills stood shoulder to shoulder, one of rock, one of turf, one of forest. They were so steep, it seemed as though only goats could find a foothold upon their flanks. Between the hill of rock and the hill of turf lay a great gorge, overhung by cliffs and full of shadows. The hills themselves were bathed in warm sunlight, and the water was partly in shadow and partly in light. A mother loon and her smart little chick were swimming down the lake, and seven or eight great blue kingfishers flew up and down its borders, sounding over and over again their watchman's rattles. This was Loch o' Law, a gem worthy of its rare setting and of its place near the heart of Cape Breton. From it the escaping waters rush downward to help form the Northeast Margaree River, and the road we were following led us down with the stream to the pleasant intervale where geese wander in flocks up and down the roads, and salmon swim proudly in the bright waters of their favorite river.

From Northeast Margaree to Margaree Forks, and from the Forks up the Southwest Margaree to Loch Ainslie, the scenery was not equal to the task of dispossessing Jim of the foremost place in our minds. Jim shied, stumbled, sweated, until we thought disintegration was near at hand, and, worse than all, required unremitting guidance to keep him in the road. Had the natural beauties of the country been as great as we expected, I doubt not that Jim would have tipped us into the swift-flowing waters of the Southwest Margaree long before Loch Ainslie was reached. Had Jim been the horse he might have been, we should have enjoyed much more the pretty glimpses of moving water, the deep pools tempting a passing cast, the meadows thick with spikes of splendid orchids, and the rounded hillsides thickly clad with woods.

Loch Ainslie is a beautiful sheet of water, covering in all about twenty-five square miles, and surrounded by good farm land running back upon high hills. Highlanders settled the country, and their descendants, who still own the farms, are eager, like so many of our New England farmers, to sell their places, and try life under less picturesque but more profitable conditions. We were welcomed to a Highlander's home, and told where we could fish to advantage from three o'clock till dark. Long before tea time we had

caught more trout than we could eat for supper and breakfast, and by nightfall Loch Ainslie had impressed itself upon us as the most beautiful part of the Margaree country. This it did mainly at sunset, when, from near a grove of lofty pines, we watched the most delicate tints come and go in the sky, on the distant western hills, and in the fair lake itself, with its miles of rippling water blushing and paling in sympathy with the heavens. While the sunset lasted we thought more of color than of form in our beautiful surroundings; but after the passing away of orange, yellow, pale green, violet, and finally blue itself, we were soothed by the lovely contour of the beach, the silhouettes of the pines, the sweep of hill crest, the pallid lake, and the mystery of the unfathomable sky.

Next day, August 5, we drove from Loch Ainslie to Whycocomagh, called by the natives "Hogomah," and there, with a sigh of relief, put Jim, the buggy, and ourselves upon a steamer, and returned to Baddeck without further weariness of spirit. This part of the Bras d'Or is like the rest of the great labyrinth of inland sea, charming at every point. At times so narrow as to be more river than lake, it winds around high wooded hills, curves into countless bays, and then expands proudly to meet the Little Bras d'Or at Baddeck.

Early on the following Monday morning, having in the mean time eaten wild strawberries picked in the larch swamps and spruce thickets back of Baddeck, we set out for Cape Smoky. Theoretically we were going on foot, but it so chanced that the kindest and most entertaining of friends found it convenient to carry us eighteen miles northward to Englishtown, on St. Anne's Bay. Sullen clouds hung over Bras d'Or, as we drove for a mile or two along its shore before entering the woods and beginning the long and easy ascent to the watershed between lake and bay. Gradually the sky assumed a more threatening aspect, and when at last the height of land was reached, and we saw before us St. Anne's Bay, narrow at first among the trees, and growing broad as it met the sea and faced boldly northward towards Newfoundland, huge black clouds rolled eastward, pouring cold rain upon mountain, bay, and road.

We drove faster as the tingling drops splashed upon us. Dashing through dark spruces, spinning down steep grades, round sudden curves, over frail bridges which spanned foaming brooks, and then out into the open, we found the bay on our left, and beyond it, showing dimly through the storm, a large mountain. It was Barasois (or Smith's) Mountain, and from its left North River emerged to empty into a broad

arm of the bay, while behind it, further north, the Barasois River, winding through primeval forests, flowed eastward to reach the sea ahead of us outside of the mouth of St. Anne's Bay. Soon we saw Englishtown a mile or two in front of us, on the eastern side of the bay, and then we noticed, apparently running from shore to shore, a narrow white bar which separated bay from sea. Now the clouds began to break and roll away, and far, far beyond the bar we could see headlands of various degrees of dignity and grandeur looking seaward. The last of them, very distant, very high, cloud-capped, with a front like Blomidon's steepest face, filled us with a yearning to reach it and worship at its mighty shrine. It was Smoky, the monarch of the northern sea.

Glorious yellow sunshine poured down upon Barasois Mountain and the heaving waters of St. Anne's Bay as we entered the little fishing village of Englishtown. The worst of the storm was passing beyond us, and myriad perpendicular lines of falling rain were ruled from sea to sky across the north. With latent impatience we rested, ate, and said good-by to our friends. Then our feet tramped the muddy road, our noses sniffed the atmosphere of drying cod on the flakes, our ears listened to the song of the juncos, and our eyes gazed forward, northward,

toward Smoky. The head of the great cape was cloud-capped, but this made it seem all the more heaven-reaching.

Turning to the left from the road, we descended to the shore of the bay, and found ourselves just opposite the long white cobblestone bar which we had seen afar off. Between us and its tip lay a deep channel which connected St. Anne's Bay with the ocean. On the shore was a boat, and an impatient ferryman stood by it watching us descend. "Where are you going?" he asked, his keen eyes searching us. "Northward," I answered. "Like the wild geese," he said, with a mocking laugh, and pushed off into the current. He was Torquil McLean, well known to all who travel on the North Shore, and holding in his face many a suggestion of the Highland stock from which he is descended, and the wild north country in which he lives, and its counterpart in which his race was moulded. His strong arms soon brought us to the bar, upon which two wagons, several people, and a sheep were awaiting his arrival.

A road, scarcely perceptible at first glance, lay along the bar towards the beginning of the North Shore country into which we were venturing. Between us and the north pole there was nothing legally definable as a hotel. This vague

track over the cobblestone beach led to the mainland, and then, past farm and fisherman's hut, thirty-four miles to Ingonish Bay, and thirty-six miles more to Cape North. Our lodging-places must be the simple homes of Gaelic-speaking Presbyterians, in whose eyes we should be foreigners, not to say heathen. Letters from James Dunlop, of Baddeck, addressed to various members of Clan McDonald, were our principal hope of hospitality. The dimly marked road and the cobblestone reef, wheeling, shrieking terns, pounding waves from the northern ocean, and a sight of new and strange plants combined to thrill us with a sense of charming novelty and wildness. It was still early in the afternoon, and as we did not care how far we advanced, having already been carried as far as we originally planned to walk that day, we strolled slowly along the bar, enjoying the mere fact of living.

Among the plants growing upon the loosely packed, egg-shaped stones was one quite unfamiliar and of most uncommon appearance. Its succulent and glaucous leaves were bluish-gray in color, and set thickly upon prostrate stems which radiated like devilfish tentacles from a common centre. The leaves diminished rapidly in size as they left the root, and at the extremity of each stem there were uncoiling clusters of

exquisite flowers somewhat resembling those of the forget-me-not. Flowers fully developed were delicate blue, while buds and half-opened blossoms were pink. It seemed to me that I never saw a plant more perfectly in harmony with its surroundings. Lifting no surface for the storm winds to seize upon, it nevertheless covered much ground. Its delicate leaf tints sympathized with those of the polished stones and sea-bleached driftwood upon which it grew, yet its flowers drew from sky and sea a more pronounced beauty of color sufficient to allure the butterfly and attract the bee. The botanical name of this charming plant is *Mertensia maritima*, though why Gray's manual calls its flowers white is more than the Cape Breton plant can answer.

As we neared the mainland, stunted spruces and firs grew more abundant and bolder, flowers more numerous, and the road plainer and less rocky. Birds other than the weird terns flew before us, or sang to us from their cover. When we reached the higher ground, the sense of novelty and isolation faded, and the world seemed more like its old southern self. The road ran along the shore as closely as it could without much winding, and as we progressed northward we left St. Anne's Bay behind us, and gained a view southeastward along the coast

towards Sydney and the entrance to the Bras d'Or. Still the beauty of St. Anne's followed us, for the glimpses which we had now and then of its slowly diminishing shores were of sturdy mountains with forests reaching to the waves, valleys in which the shades of evening were gathering, and farm lands upon which the short thick grass lay like velvet in the slanting rays of the sun. The view eastward was more rugged. Strong faces of rock turned towards the sea and fought the waves which had crumbled them, and torn away all but the hardest cliffs and ledges. One long finger of rock reached into the ocean, and pointed to a group of islands which may once have been a part of it. They were not green isles with sandy margins, but huge angular masses of rock with high cliffs, under which storms might rage for centuries without dragging down the grim ramparts.

We passed a few farms, with houses and barns standing far back from the road, as is the fashion of these Highlanders, but most of our way lay between pastures, mowing-fields with short grass partly cropped by the scythes, and woodland where black and white spruces and balsam firs grew densely together. Upon a meadow bordering a salt creek a flock of yellow-legs were whistling noisily, and back and forth over them kingfishers were flying with their

usual cry. As the sun drew near the hills, we stopped at a house and blacksmith shop and presented the first of our letters. William McDonald lived here, and our request was that he should drive us on our way to Indian Brook, where, at Angus McDonald's, we hoped to spend the night. William had only a two-wheeled sulky, which could scarcely carry three; so it was a relief to all of us when we saw, coming from the bar, a youth in a wagon, driving a sprightly nag at a rattling pace. After a brief conversation in Gaelic, William announced that the youth would take us twelve or fourteen miles up the coast to French River, where we were sure of a good bed at Sandy McDonald's. A moment later we were packed in, three on a seat, and dashing northward as fast as the pony could tear. The youth would have done credit to a Spartan mother. I never met any one of his age and intelligence who knew so well how not to talk. He answered my questions with the fewest possible words, but asked nothing in return. He knew the names of capes, islands, birds, animals, trees, and many flowers, but it took a separate question to drag each item from him. Meanwhile he kept the horse spinning. We had no time to shiver over holes in bridges; the horse knew his business, and jumped the holes, at least, if he could not jump the whole

bridge. Ruts and gullies were ignored, and we learned that, if taken quickly, two ruts and a gully are almost as good as a level.

Twilight was growing upon the earth, and far away over the pale sea the light off Cape Dauphin, on the Ciboux Islands, was flashing its message of mingled hope and warning, when suddenly we plunged into gloom, wheeled around a dizzy curve, and crossed a long iron bridge. Below us a river's dark waters reflected the waning glory of the sky. This was the Barasois, one of the salmon rivers of which we had heard fisherman's tales at Baddeck. Two miles more brought us to Indian Brook, and again a great curve and a dash through the woods prepared us for another angle and a sharp descent to a long bridge so full of holes that we felt as though only angels could have kept our pony's flying feet out of them. A vision of cliffs, deep black pools, and distant mountains with serrated spruce forests against the sunset sky made us determine that Indian Brook should not be passed on the gallop when we returned from Ingonish, if indeed that happy day ever came.

Darkness having taken full possession of the earth, our charioteer urged his horse to even wilder efforts, and we shot through dim dangers with teeth set and eyes vainly scanning the gloom to see what next impended. It was in this fash-

ion that we tore across a field towards the cliffs, apparently with certain death before us, whirled under a steep bank, and found ourselves on the ocean's edge, in front of a long, unpainted building, before which, standing or sitting upon the loaded fish flakes, were a dozen or more men. Half an hour later, the telegraph operator at the goverment office, a mile up the road, ticked to Baddeck the following message given by our Jehu: "Them Yanks, the man and woman, are at Sandy McDonald's this night."

"Them Yanks," stiff, stunned, sore, hungry, cold, and petrified with astonishment, stood on Sandy McDonald's doorstep and silently gazed up and down upon land and sea. Truly they had been cast upon as unique a shelter as this world had ever yet offered them. The long, low house clung upon the edge of the bluff, with only the width of the fish flakes between it and a sharp descent to the ocean. Behind it rolling grass land cut off the west. Southward a line of bold rocky cliffs overhung a narrow beach, upon which the waves broke and cast foam from many fragments of ledge which dotted the shore. Through a similar line of bluffs on the north French River had cut its way, but instead of reaching the ocean directly it was turned aside by a huge cobblestone barrier raised by storms, and so was compelled to flow nearly parallel to

the shore for many rods, finally reaching the sea just at the foot of the fish flakes and in front of the house. Eastward and northward, as far as the eye could see, lay the open ocean. The only distance not sky or sea was the broken shore near Cape Dauphin and Point Aconi, which limited the view towards the southeast and south. Just below the fish flakes were several fishermen's huts, crowded together upon uncertain foundations above high-tide mark. Boats, great tubs for oil, more flakes thickly strewn with split fish, masses of seaweed and fish heads, big fragments of rock worn round by the waves, oars, sails, ropes, nets, lobster pots, and nameless relics of storm and shore lay in wild confusion at the foot of the bank. All the odors of Billingsgate rose to salute our trembling nostrils, and stronger than all sights and smells came in ceaseless iteration the singing and sobbing of the great waves.

Sandy McDonald gave us a hearty welcome, and ushered us into a cosy parlor, from which opened a tiny bedroom. Simple food, reading by McDonald from a Gaelic Bible, a long breath of ocean air, and the benediction of the stars fitted us for early and profound sleep. It was not until gray dawn that I awakened, and, throwing a blanket over my shoulders, stole to the door and looked out over the sea. The fishermen were

already afloat; several boats were a mile from shore, and others, with sails flapping and oars thumping, were working their way towards the east. Across the far horizon lay a long, low bank of white fog. The sun came slowly from it and looked at the drowsy world with its one red eye. Its light touched each wave as it broke, and through the thin green-combing of the breaker the sun's glow was rose-colored and exquisitely beautiful. So, too, the rosy light lay in the thin water which ran back across the shining sand, as each wave subsided after breaking on the beach. Cape Dauphin and its islands floated as rosy castles in a distant haze, and the bluffs close to me put on soft and alluring tints, soon to be lost, however, as the sun grew clear, and by whiter light robbed the scene of most of its peculiar charm.

It was not until after another period of sweet sleep that we began our walk of fourteen miles from French River over Cape Smoky to Ingonish. The day was warm and clear. Smoky stood up boldly against the north, facing eastward towards the open sea with a front as steep as Blomidon's, and nearly three times as high. For about two hundred feet above the ocean the mountain's face was reddish rock; thence for a thousand feet low trees clothed the rampart with soft green. The top, running inland a long distance, appeared

to be level, and either wooded or covered with bushes. Between us and Smoky two minor bluffs pointed into the sea; but they were dwarfed by the loftier cape, and served only as milestones to cheer us on our way.

After walking a mile or more we met two men, who addressed us pleasantly, and turned to walk with us on our way. The older of the two was over eighty, and told of his far-away birthplace in the Isle of Lewis. The younger, a man of sixty, was very tall, and saw this world through but one eye. We soon found that it was his son who had been our laconic charioteer the evening before, and as the talk progressed it became evident that Big Rory, as this canny man is called from Baddeck to Cape North, was not in favor of our walking over Smoky, when his horse and wagon could be earning more American dollars by carrying us. We withstood his arguments, however, and enjoyed his flow of genial and intelligent conversation. I felt sure that had Cape Breton been called upon to take an active or courageous part in this world's doings while Big Rory was young, he would have been a power in her life. True, he is that in a way now, politically; but provincial politics are so lacking in all that is pure, patriotic, or intelligent that neither Big Rory nor any other strong man has much

chance to make head against the undertow of corruption and prejudice.

By noon we had reached one of the last houses on the southern side of Smoky. Here we sought dinner, but found, alas, what too many of the North Shore people live upon, — sour bread, boiled tea, sour milk sweetened and watered, and berries. Our hosts could probably have added salt fish, eggs, and oatmeal porridge, had they felt like it. But we made the best meal we could off the food offered, and asked for no additions, feeling that what we ate might be seriously diminishing their own dinners.

Upon rather insufficient rations, therefore, we advanced against Smoky, and began the ascent by following inland a noisy stream which flowed seaward along the mountain's southern border. After carrying us deep into the forest, which was by far the most lofty and vigorous growth of trees we had thus far seen on the island, the road crossed the torrent and turned seaward again, ascending by easy grades through a dense birch growth. On the whole, the road was well made, and showed skill on the part of those who planned it. When we reached its highest point, we found the top still unconquered; so, striking through bushes and over steep ledges, we clambered to the undisputed summit, and there paused to survey the panorama below us.

It was assuredly a magnificent view, and one which will in time lead many feet to the ledges now mainly enjoyed by berry-pickers, bears included. To the west lay barrens similar to those which are said to cover the interior of this part of Cape Breton. Rocks, bushes, bare ledges, and hollows filled with sphagnum or pools of amber water were the prevailing elements in a country which now and then sustained a patch of low spruces or a larger body of mixed woods. The east was ocean, limitless and blue. But at our feet were the wild details of the great precipice which fell away from us twelve hundred feet to the waves. Over it several large black birds were sailing, and the first croak which came echoing up the cliffs from them disclosed their identity: they were not crows, but ravens. I had been told that when I reached Smoky I must keep an eye open for ravens; and true enough, here they were.

Our view northward was limited by the fact that the foreground was filled by the great mass of mountain which we were next to cross in order to look down upon Ingonish. Nevertheless, a wide expanse of ocean showed in the northeast, and the heads of distant mountains crowded together in the northwest. Between sea and mountains we could catch one glimpse of a nearer headland, with a church steeple rising from a village at

its heel. It was the southern view which held us enchanted even when we felt that we must pause no longer. From the foot of Smoky back to the far seclusion of St. Anne's Bay the cliff-lined coast we had traversed lay in profile before us. Headland after headland pointed eastward, and valley after valley wound back among the hills and forests. From St. Anne's Bay the coast turned eastward and ran away into distance, coming out boldly at Cape Dauphin and Point Aconi, and retreating again at the mouth of the Bras d'Or and the entrance to Sydney Harbor.

Later in the afternoon Smoky gave us one more view, which, by reason of marvelous lights and shadows in the sky, was even more beautiful than any other picture which Cape Breton or Minas Basin revealed to us. We had descended many a steep slope, and passed through a fine primeval forest where lofty beeches, yellow birches, hemlocks, and spruces presented much the same aspects which I love so well to see on the Lost Trail. We had rounded one shoulder of the mountain where the edge of the road had slipped down four or five hundred feet into a brook bed, leaving only room for a wagon to pass between the unguarded edge of the ravine and the gravel bank which rose from the road on its other side. A horse having already plunged down there, I, even on my own feet,

did not like the sensation of passing this spot. When I heard that the mail carrier went by it in his sulky or sleigh night after night, summer and winter, I wished that the highway commissioners for this district could be compelled to travel with him on his dangerous way. Soon after leaving this place, the road came out on an open hillside commanding an uninterrupted view of all that part of Cape Breton lying north of Cape Smoky. The coast in profile extended northward until its details were lost in distance. Bays, headlands, islands, sandy beaches, lighthouses, cosy villages, passing ships, sailing ravens, and sparkling waves shone on the right, while on the left mountain after mountain, all heavily wooded, though showing many a bare cliff or sculptured summit, filed away from foreground to distance in mighty ranks. A huge mass of storm cloud, sent down from the Bay of St. Lawrence, was sweeping proudly across the sky from west to east. At some points it was inky black and quivering with lightning, at others it was white or gray, while on the edges of the thunderheads golden reflections from the hidden sun gleamed as the banners of the cloud army which slowly spread across the plains of blue. In the north there arose the dim outline of a high mountain. We knew that it must be very near to Cape North, and we fancied that

from its summit Newfoundland's gloomy crags might be seen across the sea.

One of the nearer mountains attracted our notice by its strange outline. As it lay against a background of black cloud, its profile of naked rock was sharply cut, and high up on its precipitous face a slender column of stone projected from the mass, as a ship's figurehead leans forward from the bows. It was like a human form poised over a black abyss, yet lifting its weak arms towards heaven. From among the nearer mountains a river could be seen winding towards the sea. It came along the foot of Smoky, spread into a landlocked basin, yet found a narrow channel for itself between a lighthouse and a bar, and so gained the outer bay. This outer bay was cut in twain by a slender rocky promontory, with picturesque outlines, high cliffs, and deep clefts in its side. On the northern margin of the farther bay was Ingonish village, and along the western border of the nearer bay — on the bar, in fact, or close to it and the lighthouse — was another hamlet, called Ingonish South Bay. It was to this nearer village at our feet that we looked with most interest, for it was our *ultima Thule*.

INGONISH, BY LAND AND SEA.

Under the northern shadow of Cape Smoky there is a double bay, cut in two by a rocky peninsula called Middle Head. Into the half of the bay next to Smoky, and chafing restlessly against the foundations of its richly colored cliffs, runs the Ingonish River, which comes from the almost impenetrable forests and morasses of the interior of northern Cape Breton to pour its clear waters into the ocean. No bridge crosses the stream, and the traveler who descends from the heights of Smoky towards the fishermen's hamlet of Ingonish South Bay, which he sees scattered upon a sandy spit at his feet, finds himself halting upon the edge of deep, swift water, with cove on his left and bay on his right, and never a sign of a way across. If his voice is strong and clear, he may waken the fishermen's dogs on the other shore, and, what is more to the purpose, bring a red-haired, blue-eyed lad to the flatboat on the sand, and to the big sweep which will presently urge it across to the foot of the red cliffs. The people of Ingonish are in part of Irish parentage and in part of Scotch, but they are

almost all members of the Roman communion, and made of different stuff from the blue Presbyterian Highlanders who dwell along the coast between Cape Smoky and the head of St. Anne's Bay. In the best of the houses, which stand one beyond another on the South Bay beach, lives Mr. Baker, whose hospitality makes a journey beyond Smoky a possibility, and more than that, a pleasure. Here may be laid aside the stoicism needed to sustain life during the journey up the north shore; and here, in the midst of restless ocean, tawny sands, red cliffs, undulating forests, and brooks alive with trout, can be found all that nature can give to stimulate happiness or to lull the troubled mind, and all that the reasonable wanderer can expect to find to make his weary flesh comfortable. In the days which we spent at Mr. Baker's we learned to love Ingonish more and more, as we explored it by land and by sea.

I.

BY LAND.

The breath of fire floated in the air, making it hazy, softening the mountain contours, giving a wicked look to the sea, and filling me, through its perfume, with the same feeling of unrest that the moose and caribou have as they feel the smoke of burning forests tingling in their nostrils.

Looking inland, I saw the hills marshaled along the river, rank behind rank, with their relative distances clearly defined by the smoke. The mercury was above 90° Fahrenheit, and mountain climbing was not to be thought of. Middle Head, seen across the waves, suggested cool breezes, and towards its lean, half-grassy, half-rocky finger, pointing ever eastward, we took our way. From Mr. Baker's, half a mile of sandy road runs northward parallel with an ideally beautiful beach. Then the road bends to the left, inland, while the beach curves to the right, seaward, rising soon into sandy banks, which in turn change to sculptured cliffs at whose foot the sea murmurs.

Terns with black-tipped wings skimmed close to the restless waves, and over the fretted sand where the ripples had left the marks of their lips. No one walked upon the road where man had scratched together badly the same sand which nature had made perfect by the tides.

When I looked at Ingonish beach as it was, silent, lonely, serene, and pure, I thought what it might some day be made if fashionable men and women, on pleasure bent, chanced to discover it and to feel the thrill of its sun-tempered tide, which is as mild as that of their favorite but more southern shores. Now, at least, the absence of hotels where such men and women

might be fed and put to bed, if by chance the sea or their own feet cast them upon these distant sands, makes it certain that they will not come to banish Eden by their presence.

Between the sand beach and the road there rises a massive wall of rounded stones, varying in size from a goose egg to a human skull. Can waves alone have raised such a dike? The same question came to me as I studied a similar wall running along the seaward side of the bar which well nigh makes St. Anne's Bay a lake, and Torquil McLean's ferry a superfluity instead of a somewhat malodorous joy. Perhaps the fact that often, in winter, the ice comes stealing across from Newfoundland and the seas that lie beyond it, and packs itself against St. Anne's bar and all the north coast of Cape Breton, may explain these walls. The thrust of the ice could scour the shallows for miles, and bear along loose stones to the first beach whose sloping face would receive them. The density of the arrangement of these stones, and the abruptness of the front which they present to the sea, point to ice action rather than to that of waves alone. The wall is so high that those walking or driving along the road cannot see the beach, while those bathing cannot see the country inland. Shut in between shingle and sea, we walked the length of the sand, and then climbed to the top of the bluffs of Middle Head.

The evening before, while watching meteors from the beach, we had seen the sky above Middle Head suddenly lighted up by a bright fire. It lasted ten or fifteen minutes, then died away so quickly that we felt sure no building could have been destroyed. Now, on the narrow path leading along the edge of the cliffs, we met three men. They bowed and touched their caps with the smiling politeness characteristic of most of the natives, Gaelic or Irish. I asked them what and where the fire had been; and in a few words they said that Rory This had bought the right to cut grass on Sandy That's land, but that after the hay was made a dispute arose as to the price; so the hay had been burned to quiet the trouble. I confess I could not reason out the process by which either Rory who had labored, or Sandy who had owned the grass, could find comfort in putting match to the hay.

Some of the rock which supported Sandy's scorched hayfield, and which formed portions of the cliffs of Middle Head, contrasted strikingly with the prevailing red syenite of the Ingonish region. It was white; not, however, like newly fallen snow, but like that which this world has somewhat soiled. Gypsum, or "plaster," as Cape Breton calls it, occurs in many places on the Bras d'Or and along the north

coast. It suffers much more from the action of water and frost than the harder rocks surrounding it, so that where it appears on the surface there are sure to be odd depressions in the soil, "sink holes," into which earth and trees have settled; or, in cliff faces, deep hollows, coves, or caverns. The path along Middle Head follows closely the trend of the shore, and from it we found ourselves looking down into the most suggestive little cove that smugglers would care to own or story-writers to dream over. Its opening to the sea was narrow, and all its walls were high and steep, yet it had a tiny sand beach where a boat could land easily even if storm waves beat angrily on the stern cliffs outside.

About halfway out on the Head we came upon a spring, — a cup-shaped hollow in the mud, filled with sun-warmed water, — which tempted us to rest near it under the low pines and spruces, where Cape Smoky could be seen across the bay, its richly toned cliffs wonderfully worn by waves, and its lofty head resting in the haze that gives the mountain promontory its name. Its outer point, which cuts in twain waves unchecked from the Grand Banks, is called "the Bill of Smoky." From this point back to the Ingonish light the syenite crags rise supreme above waves or ice. Near the lighthouse the lines of Smoky grow more gentle.

The forest, which above the Bill is but a narrow line next the sky, slopes downward to the placid water inside the bar, and rolls on westward to join other expanses of spruce and birch, hemlock and maple, which clothe the mountains and fill the river valley with soft foliage. While dreamily watching this fair northern picture, as it quivered in the heat of a half-tropical day, we were startled by a sudden cry which came from the waves far below. Then a man, with a coil of rope on his arm, passed us, and went cautiously to the edge of the precipice, over which he peered and made signals. Thoughts of smugglers, of hidden wines brought by night from St. Pierre, of a discovery by the smugglers that we knew of their landing-place, and finally of the consequences of their discovery, floated through our minds, already saturated with the romantic elements of Ingonish scenery and life. Then more men came, and passed. They too crept to the edge and looked into the dizzy waves beneath. One of them lowered the rope over the cliff, and seemed to be trying to lasso something many feet below. Our curiosity prevailed over our timidity, and we drew near to the edge of the rock. The vision of smuggled champagne faded, and in its place was put the truth: that a sheep had gone over the cliff to a narrow shelf more than halfway down to the sea, and that these

men were trying to rescue him alive, while a boy in a boat tossed by waves below shouted advice to them.

Middle Head, and many a mile of coast north of it, is the home of the raven, or "big crow," as the Ingonish people call him. Close to the smuggler's cove a long, ragged point juts out from the cliffs. At its extremity huge masses of broken rock lie in the wash of the tide. As we passed this point, I saw an uncanny shape squatted upon its outer rock. It was a bird, web-footed, gaunt, black, vulture-headed, yet with a sac, a hideous skinny object, fitted like a pelican's pouch beneath its beak. A native passing said it was a "shag," which meant nothing to me until I found that "shag" and "cormorant" were two equally expressive names for this same nightmarish bird of rock and wave. I crept out upon the point, first skulking behind wild rose bushes and goldenrod, and then coasting down a sandy slope, out of sight of the spectre I was stalking. Gaining the water's edge, I clambered along among huge rocks upon which seaweeds grew and trailed their fingers in the tide, and so came nearer and nearer to the shag. Suddenly I looked up as a huge shadow swept over me, and saw, black and big against the hot sky, a passing bird which watched me with keen eyes. Growing from the rocks which overhung

me was a hunchbacked pine, the sport of every mocking wind that harried this rough coast, and in its bent branches sat five ravens. They croaked, but did not fly, satisfied to watch me as I squirmed over the rocks towards the black beast with a throat sac. In coloring and shape they were like crows, yet I knew they were not crows; something in the shape of the head was different; they did not treat me as crows would have done. I felt that they were strangers.

When I reached the last rock which could by any chance shield my body from the cormorant, I raised my head very slowly until my eyes came upon a level with the rock's upper surface. About twenty feet away, clasping with its hideous feet the last rock left naked by the tide, sat the shag. It seemed to me that it might be a bittern which, having offended against the gods, had been condemned to leave its beloved meadows and thickets, whispering rushes and perfumed grasses, in order to pass ages upon the shores of a sobbing ocean in which it should find no peace and no abiding-place. Its garb looked as sackcloth and ashes might well look after a thorough soaking in salt water. When it craned upwards its skinny neck and panted, it reached the climax of its loathsomeness, for the livid sac pulsated under its distressed breathing. I had watched the horrid fish-eater long enough, so, rising to my

full height, I had the satisfaction of seeing the monster shrink into itself with fear, turn its ugly countenance seaward, and then flap away over the hot, sparkling waves until almost out of sight. When half a mile out, it turned and flew slowly along the crest of the waves towards the rocky cliffs of Middle Head, and then dropped suddenly into the water, upon which it remained bobbing like a duck.

Free from this incubus, I looked once more upon the home of the ravens, — the hunchbacked pine, the shattered rocks, and, far above them, the cliffs upon whose inaccessible ledges young ravens first see light. The surroundings were those of a sturdier bird than the crow. There were no gently sighing forests, waving corn-fields, or placid lakes here, but instead the stern crags, rude sea, and broken rocks, — makers of deep, angry music, harsh discords, and wild, sorrowful refrains. The crow boasts from the moment his loud voice first comes back to his ears from the echoing hillside, he steals from the time he sees the corn blades start from the furrow, and he shuns danger as often as the tread of man or deer snaps a dry twig in the forest. The raven's croak can wake no echo to match the sea's chorus, his food is not won by theft, and dangers which come from sky and tossing wave are not such as to stimulate craft or to inculcate wariness.

II.

BY SEA.

All day long heat had quivered in the air and sparkled on the sea, but now, at evening, there was coolness creeping in from the ocean, past crag and sand, banishing ennui and tightening strong muscles as they tugged at the oars. The coolness and the wind seemed to have little to do with each other; for the wind was westerly, and came down river from the forest-clad mountains, while the coolness came in from the east under the deep shadow which the red cliffs of Smoky cast upon the bay. Thump, thump, the oars pounded forward and back upon the tholepins, and the boat moved slowly forward inside the bar towards the gut. The heavy sail did us no service; merely made me more alone in the twilight, as I sat in the bow, with my back to the mast, and watched the waves heave under us.

We were turning our backs to the hills now, and heading straight out through the gut. On the right was the lighthouse with its newly lit red star glowing inside the polished lenses. Above it towered the beginning of Smoky's cliffs, still deep red in the twilight, or green where the forest far above caught the last rays

of a fair sunset glow. On the left, the long beach and bar ended in a pier, with fish-houses and boats, men smoking, cod drying on the flakes, lobster pots piled up for the season, and collie dogs watching life go by on the tide, or dreaming as they lay on the dry nets. Dead ahead, a fisherman's boat was coming in close to the pier, its oars splashing in the choppy sea where inner and outer waters wrestled in the narrow pass. Our oars thumped louder, and we shot through the swirl, and out past light-house, pier, boats, rocks, and the residue of land and life, towards where the sea, the sky, and Smoky lived in a great dream together. Surely this place was beautiful, and to-night, as I sat in the bow alone, the flapping sail behind me, the rise and fall, the heave, surge, and wash of the sea lent a magic joy to the voyage we were taking out to the Bill of Smoky. I looked far ahead and strained my eyes to see what was beyond; and then I thought, what matters it to look, to strive to see an end, a goal, when there is no end, no goal, to see? This is no mountain, with ridge after ridge to surmount, and an ultimate peak to conquer, with all its prizes of prostrate earth and nearer clouds to look upon. This is only the sea with its monotonous level, having in its endlessness no incentive to action, no stimulus to struggle. Still I

kept gazing out into the distance, and wondering whether some dim sail would not appear in the gloom, or some rock rise from among the billows for our boat to break itself against.

As we glided on our undulating path across the restless water, the dark mass of Cape Smoky attended us on our right like a shadow. The waves splashed incessantly upon the broken rocks at the foot of the cliffs, and sometimes in the hollow of a wave not far from us a jagged mass of rock flashed menacingly for a moment before the water slid over it again and hid its threat from our eyes. The hand of time falls heavily upon the red syenite, and every year huge pieces of rock drop into the sea and become the sport of the tide. At one point a buttress of rock protruded into the bay, and through it I could see light. The busy waves and frosts had carved an arch in the stone, through which birds could fly and storm winds blow. Far up the cliff a brook, which had worked patiently downward from the soil on the summit of the mountain, appeared in a circular opening, and dashed its small spray seaward. Most brooks must fight their way over boulders and fallen trees, through dark ravines, by hot waysides and sleepy meadows, at last to win only a right to merge their lives in the greater life of the river. This brook had gone straight to its mother ocean,

unchecked, unturned, and when its clear, cool drops fell towards the sea they were as pure as when they left the sky. The brook seemed symbolic of some lives, which, though living out their appointed time, go back to the source of life without ever having been polluted by society, or lost in its sullen and ill-regulated current.

Thump, thump, thump, the oars worked with their clumsy rhythm, urging us eastward, and out towards the line of rough water beyond the Bill. The swell grew stronger, and now and then the boat rose so high or fell so low that my dream was interrupted by the emphasis of the motion. Far behind us the red eye of the lighthouse glared at the mouth of the harbor, and marked upon each wave's edge the path by which we had come, close under the shelter of the cliffs. A few strokes more and we were abreast of the Bill, that ultimate wedge of rock which Smoky thrusts into the northern sea, piercing the cold waves, and dividing the fierce storm currents beating down from Newfoundland. The wind was fresher in the unprotected sea, and the lighthouse with its nestling lights upon the bar seemed much farther away than it had a moment or two before. A sense of loneliness, almost of danger, crept over us, and by common consent the boat was turned backward into the

shelter of the great rock, and the homeward voyage begun.

It was now my turn at the oar, and a thrill passed through me as I grasped the great sweep and wrestled over it with the waves. Night had fallen. All color had died on the red cliffs of Smoky. Stars had burned their way into the dark blue sky, and among them stray meteors fell seaward, or glided athwart the constellations. A year before, I had spent the long hours of the night on the peak of Chocorua, watching these wayward waifs of space as they danced behind the cloud curtains of the storm. Now, with all a Viking's zeal, I tugged at my big oar, pounded my tholepin, made deep eddies chase each other in the dark water, and breathed joyously deep breaths of the salt northern air. What contrasts man may make for himself, in his life, if he yields to the spirit of restlessness within him! The Vikings yielded to it, and swept the northern seas, and I felt in my weak arms something of their strength and wantonness as I urged the boat homewards under Smoky's shadow. Black rocks, placid sea, bright stars, dancing meteors, and breath of the northern ocean, — I had them all, even as the Norsemen had them.

A faint protest came from the other side of the boat. We were not rowing a race; there

was no hurry; and if I cut inshore any farther we should go on the rocks. So I eased my frantic stroke, and watched the phosphorescence play in my oars' eddies. In the sky, bright masses ploughed their way through our air, impelled by an unknown force, driven from an unknown distance, and aiming for an unknown fate. In the sea, bright atoms ploughed their way through the water and glowed in soft splendor. The meteors are inorganic, dead mysteries. The phosphorescence is an organic, living mystery. Yet it is no more impossible to imagine the history and future of a body perpetually traveling through endless space than to try to count the numbers of these phosphorescent myriads. Generally I have the feeling that science is bringing us nearer to a perception of what the vast creation is which surrounds us, but at times the greater truth flashes before my eyes, — that what we are really learning is not more than a drop in the limitless ocean of fact.

The row back to the lighthouse seemed shorter than the voyage out, partly because we really went faster, and partly because we had less detail to look at, now that the night had covered the beauties of the many-toned cliffs and the distant mountains. When we shot through the gut from the bay to the inner basin,

the air became damper and the darkness more intense. With caution and frequent peering ahead we rowed towards the creek in which we were to land. Here a shoal had to be avoided, there a fisherman's boat passed by.

Now in the gloom we could discern a mass of willows in which the kingfishers had been sounding their loud call during the day, and beyond them loomed up the timbers of the old mill whose wreck was to be our pier. Poor old mill, it had been starved to death by tariffs, a grim punishment for its slaughter of many a good king of the forest. We landed, and in the soft stillness made our stumbling way across field and pasture to the cosy Ingonish parlor, where, in strange contrast to rugged coast, and stern mountain, and the general simplicity of the fishermen's houses on the shore, we had found refinement, comfort, and open hospitality.

Beyond the great wall of rounded stones, raised by ice and storm, lay the beach. The rippling waves played softly upon the firm sand, making dainty lines across it. We could hear the murmur of those waves and the faint rustle of the breeze in the shrubbery. All was peace and gentleness, yet under that kindly music those who knew Ingonish Bay could hear other voices. High in the air the powers of the storm were holding council, and deep in the sea the

tides were planning to hurl themselves upon the shore. It is always so by the northern ocean; and when the waves break most lovingly upon Smoky, the old mountain and his children the fishermen are most alert for the tempest which is to follow.

THE HOME OF GLOOSCAP.

THERE are siren voices at Ingonish. I can say this with confidence, because I heard one, and it rings in my ears now, and will ring there as long as memory lasts. I was lying on the sun-lit sand outside the cobblestone wall of Ingonish South Bay beach, dreaming. To my right rose the red, forest-capped wall of Smoky, on my left was Middle Head, and behind me many a mountain side walled in the valley. Suddenly, the heavens, the bluffs, and the mountains gave out a sound which made my heart stand still. It had the force of thunder and the pitch of agony. I was told afterwards that the first time the sound startled Ingonish was at night, and that people fled from their houses or fell upon their knees, thinking the day of reckoning had come. Springing to my feet, I saw, coming slowly past the cliffs of Smoky and towards the lighthouse at the pier, a good-sized steamer. It was the Harlaw, from Halifax via the Bras d'Or lakes, on her way to Newfoundland. As I lay upon the sand, I had been dreaming of a voyage across those sixty miles of sea to the rock-bound

island just out of sight below the ocean's cheek. The Harlaw's siren had banished the dream in more senses than one. To take the steamer now was impossible, and only by that steamer could I go to Newfoundland.

The next morning, consequently, we turned our faces towards home, and started southward. Mr. Gillies also turned his face towards home, and started southward; the difference being that in his case home was at Ingonish, northward, and that he faced it across a painful snarl of his own legs and arms, as he hung for dear life to the back of the wagon-seat, while I walloped his thin horse and enjoyed the comforts of the driver's cushion. Over the ferry, up Smoky, away from the home of the raven and the sweet charms of Ingonish, on, on, on we went, mile after mile, until the thin horse wearied of life, and the snarls in Mr. Gillies's legs caused him to groan aloud. At times I ventured on conversation with Mr. Gillies. When I spoke, and my quavering intonations reached his ears, a reverberating "Sorr-r-r?" was usually hurled at me with such force as to banish, momentarily, all idea of what it was I meant to say. An opinion from me was always indorsed by Mr. Gillies in one of two ways: warmly, by "Jist;" less confidently, by "Aye — yi — yi," uttered with outward fervor. In an endeavor to learn

something of the fauna of the country, I inquired whether the porcupine was found near Ingonish. Gillies assented promptly. I then asked how much one weighed when full grown. This staggered him, but after a pause he said, "Which kind of pine was you speaking of, sorr?"

Mr. Gillies's horse was not endearing in his qualities. In the first place, he was named "Frank," a circumstance I mentally resented; but what was more to the point, he had an evident desire to spill us over the steepest bank he could find. When we were passing a most dangerous unfenced slide on Smoky, where a misstep meant a plunge hundreds of feet down into a rocky ravine, Gillies regaled us with a story of Frank's overturning the Gillies family on a river bank, "breaking the sleigh to pieces all right," and then bolting for home. As Frank and his wagon constituted the only conveyance within twenty miles that could carry three persons, it was not alone love of life which made me watch the beast with unceasing solicitude. Thanks to vigilance and the whip, he carried us down Smoky, past Big Rory's, Sandy McDonald's, and so on to the valley of Indian Brook, where we planned to "stay the night" at Angus McDonald's. Standing on the bridge above Indian Brook, we saw the best fisherman

on the North Shore casting his sixty-foot line with unerring hand over the dark pool from which he had just taken a three-pound trout. In his creel lay also a five-pound trout, and his man whispered to us that a ten-pound salmon had been taken by the same magic line that morning. Battles between big salmon, or trout, and man armed with his cobweb line and tiny hook command admiration, but they make the inane hooking of six-inch trout in our New England brooks seem contemptible.

The next morning I was up and dressed at half past three, standing on Angus McDonald's doorstep, and rejoicing in the sense of lightness, purity, and strength which comes at dawn. When Gabriel blows his trumpet, I hope he will select the moment before sunrise for his summons.

Eastward, the placid sea reached away towards Newfoundland, St. Pierre, and the red sun. Newfoundland and St. Pierre were hiding behind the curve of the sea, but the sun was climbing above it, and peering, dim-eyed, through the fog. Westward, beyond a dew-drenched swale, rose the hills covered with balsam, black spruce, and white spruce. Darkness still pervaded the woods, for the sun was too dim to illuminate their pinnacles, or even to gild the sea or tint the sails of the fishing-smacks, al-

ready several miles from shore. Sheep and cows stood in the curving meadow, and a young bull, their leader, looked at me more sleepily than sullenly as I passed him. The dew was cold on the grass, and it soaked my feet; but the dew and its chill were part of the hour, so serene and pure, quite as much as were the whistle of a crossbill which flew past overhead, and the matins of the juncos which they were singing in their forest cloisters. I crossed the meadow, and followed the road through the spruces and over the bridge above Indian Brook. A narrow footpath led from the farther end of the bridge up the northern bank of the stream. Now it passed through groves so dark and silent that night seemed still supreme; then it came out into twilight at the edge of the bank above the water, and showed me that, little by little, it was climbing above the pools and rapids as it followed the channel back into the mountains.

After walking for half an hour, I came to a sharp bend in the river, which had previously been flowing east, but which here came from the north, emerging from between steep cliffs, to roar and foam over a sloping bed of broken rock. Above the music of the rapids I could hear the splash of a cascade, and by peering through the trees I could see the white form of a waterfall, half concealed by the foliage on the other bank.

A tributary stream approached Indian Brook at this point, and fell from a hilltop into a mossy basin among the large trees on the western shore. To gain a nearer view of its beauty, I clambered and slid down the high, steep bank, to the brow of which the path had brought me. On reaching the level of the water, I realized more fully the nature of the place I was in. High forest-clad hills rose on every side, inclosing the river, so that its only method of escape was through deep rifts cut into their slopes. The part of the stream which I had followed consisted of broad and deep pools of brownish water alternating with rapids. Sometimes one bank was of rock, and the other of gravel; sometimes both shores, although steep, were wooded almost to the edge of the current.

Looking upstream, I saw that the scenery above me was even more striking than that below. The river came from between abrupt rocky walls. Its waters were deep, slow, and foam-flecked. They came out of a vale of shadows, and I knew, on the word of an Ingonish fisherman, that somewhere within those shadows there was a waterfall, singularly beautiful, though unknown save to a few.

Directly in front of me, the story of the river seemed to be told on a small scale. Far up against the sky was a dip or notch in the mountain wall. Through it came the brook which

joined the river at my feet. To reach this lower level the dancing waters must fall as many yards as they advanced. Their last leap made the cascade whose splashing filled the glen with music. I forded the icy river, and entered the chamber in the side of the western bank which held the cascade, and its screen of trees, ferns, and mosses. Since leaving the open meadow by the sea and entering the dark forest, I had felt the spell of the wilderness resting upon me, the sense of age, beauty, purity, persistent force; all existing or working without man's knowledge or approval, yet being the very essence of this dewy land of twilight. On coming to this grotto of rushing waters, Nature seemed for the moment to find a voice with which to tell of her wonderful power. The falling spray was singing of the sea from which it had been taken into heaven, and to which it was hastening back after a new life. Its cycle is but the emblem of all ebbing and flowing life. The spell of the wilderness grew stronger upon me, and when, suddenly, I thought how many wearied souls there were in great cities who would love to see this beautiful, hidden spot, something akin to shame for my own race came also into my mind. If man came here, would he not destroy? His foot would trample, his hand deface, and finally he would cut down the firs, blast out the rock, choke the salmon with sawdust, and leave the

glen to fire and the briers which follow flame. It is always so; those of us who love nature and the beautiful are only the few, sure to be thrust aside by the many who value bread or riches higher than the fair earth's bloom.

Leaving the cascade, I climbed the hill over which it fell, until I reached a level terrace about two hundred feet above the river bed. There was no path here, so I simply pushed on northward, following the general direction of the gorge, and listening for the heavy rumble of Indian Brook Falls. The forest through which I was walking closely resembled northern New Hampshire timber. Here were white spruces with long, slender, light-colored cones pointing downwards; black spruces with dark cones, also pendent; balsam firs with erect purplish cones; hemlocks, pines, yellow birches, big, clean-limbed beeches, a few maples and poplars, and the mountain ash. I saw juniper, but no hobblebush. Hastening through the dimly lighted vistas, I was startled by a loud, angry cry which rang out suddenly among the treetops. I stopped, and peered upwards. Another scream echoed from the hills, and two great birds with fierce and eager eyes swooped towards me, pausing among the branches to watch me with hostile curiosity. Their coloring and size made me confident that they were goshawks. When a smaller hawk,

holding a squirrel in its clutch, flew into a neighboring tree, one of the goshawks hurled itself upon the intruder and drove it from view. They would have liked to expel me in the same way, and their startling cries and resentment made me feel as though I had no place or part in their great solitude. Nevertheless I pushed on, feeling somewhat as one does who invades a cathedral by night, and hears his clumsy footsteps protested by the echoes in the vaulted roof.

An hour and a half, or more, after leaving Angus McDonald's, I heard the booming sound of the Indian Brook Falls. Pushing through the last screen of fallen timber and underbrush, I gained the crumbling edge of cliff overhanging the river. Far beneath, the foam-flecked water crept along the bottom of a dark, narrow cañon. It passed away southward between lofty walls of rock, above which stood the forest and the higher slopes of the mountains. The space into which I was looking was a vast, circular pit, a pothole of enormous size worn in the rock by whirling water during unnumbered ages. Its height seemed to be as great as its diameter, and either would be measured by hundreds of feet. Although at high water Indian Brook doubtless covers the whole bottom of this punch bowl, at this time a long, slender sand spit projected from the western wall to the middle of the dark brown pool.

It was an index finger pointing towards the falls, whose solemn music made sky and mountain vibrate in perpetual unison.

The northern curve of the rock basin's wall was broken by a narrow, perpendicular rift reaching from the sky down to within sixty or eighty feet of the surface of the pool. This was the door through which Indian Brook had, since the time of glaciers, sprung from the bosom of the mountain, and by which it was now pouring its compressed mass, with a single motion, into the dark depths of the basin. Looking through the rift, I could discern only a few yards of flat water racing towards its fall, and black walls of rock scowling upon the mad stream which swept past them. These walls rose to meet the spruce forest; the forest sloped far upwards to meet the pale blue sky, and the slender points of the highest trees were now faintly touched by the morning sun. There was no trace of man in this solitude, yet it was eloquent with beauty and power. What the high altar is to the dimly lighted cathedral, this hollow in the heart of the Cape Breton hills is to the wilderness which surrounds it. The altar is the focus for every eye, every moving lip, every prayerful heart. This vale of falling waters is the focus of the beautiful lines of the mountains, down which sunlight and shadows steal in turn, along which brooks

hurry to the river, and through which the moving life of the forest takes its way. The ancient hemlock bends towards it, the falling boulder plunges downwards to it, and the wind coming through the embrasures and over the ramparts of the mountains, blows to it, ruffling the treetops in passing. The altar is the focus of man's senses and thoughts, but it is only an emblem even to him. This scene of beauty is a focus of Nature's deepest and purest life; and though in it man has no place, it does not on that account lack meaning or significance. Man is a masterful figure in the drama of creation, but he is not all, nor even half, what the world has long been taught to consider him. Perhaps he has been studied too much; certainly Nature, unspoiled by his greed, has not been studied enough or loved enough. Standing alone in that fair solitude, as much alone as on some atoll in a distant sea, I felt as though I might know man better, see him in stronger contrasts and clearer lights, if I could live apart from him longer in such still, calm, holy places as Indian Brook cañon.

As I walked swiftly back to Angus McDonald's, the sunlight grew strong in the woods, and shone kindly on the amber waters of the river. A hot day was beginning, and I sighed to think of the twenty-five mile drive to Baddeck, — sighed not only on my own account, but on account of

Gillies's legs and back, bent and doubled under the seat, and on account of the horse Frank, and the whip. Something which had pervaded the woods in the early morning twilight had gone out of them now. The enchantment of the wilderness seemed left behind, localized in and near those beautiful falls. Scolded by Hudson's Bay chickadees and three-toed woodpeckers, I hurried on to the highway, the meadow, and the view of the sparkling sea. Yes, Frank was already harnessed, and the twenty-five mile drive waiting to be begun.

When Frank brought us to the valley of the Barasois, we decided to turn inland, avoiding Torquil McLean's ferry, Englishtown, and the east side of St. Anne's Bay, in order to see the picturesque North River country, which could be reached by ascending the Barasois a few miles, and then passing behind St. Anne's Mountain, so as to approach the bay from the westward. This we did successfully, and arrived at Baddeck by supper time. The bridge by which this road crosses North River is one of the most remarkable objects in Cape Breton. Fairly good roads characterize the neighborhood. They are good enough to lead a driver to expect sound bridges, but instead he finds death-traps. This particular bridge is very long, and upon much of it the flooring is laid parallel to the direction of the

bridge. The ancient planks have decayed, until many holes have been made in them large enough for a horse's foot to pass through, while in long sections of the bridge the spaces between the planks are so wide that first one wheel, and then another, slips down, until the hub strikes. Needless to say, we walked across that bridge, while Gillies and Frank danced and pranced onward before us; Gillies distracted to keep his toes away from Frank's hoofs, and Frank distracted to keep his hoofs away from the holes in the planks.

The next two days were rainy: Sunday, while we rested in Baddeck, and Monday, when we bade farewell to the Bras d'Or. In a drizzle we steamed from Baddeck to Grand Narrows, — I recall a flock of ducklings swimming madly away from the steamer; we breakfasted at the Narrows, — I remember seeing a heron catching frogs in a meadow; in a drizzle we crossed the Strait of Canso, — I recall a group of young Micmac Indians coasting down a slippery bank to the water's edge, crawling up and coasting (that is, *sitting*) down again, until fog hid them from us, and us from them; still in drizzle we passed Tracadie with its Trappist monastery, and Antigonish with the pretentious cathedral of the Bishop of Arichat; in drizzle hours came and hours went, until, late in the afternoon, we passed through the Cobequid Mountains,

which I recall as gaunt hillsides swept by cloud, steam, smoke, and stinging rain; and then we were dropped in the wilderness, near a dirty tavern, at a place called Springhill Junction.

Drizzle and cinders were here, too; but my mind awoke from a semi-comatose condition as soon as we left the train. The possibility of having to spend a night at the Lorne, or the Forlorn, or whatever the terrible tavern was called, revived my rain-sodden faculties, and I began to ask questions: "Is there a train away from here to-night?" "Yes, one to Springhill." "How soon will it go?" "Don't know; when the conductor pleases, or when he is wired to go." Then I found the conductor. "How soon do you start?" "Don't know. Am waiting for orders." "Why not start now?" "Train two hours late from St. John; may have to wait for it." "Will you wait until I get supper?" "Oh, yes, certainly. Go ahead; no hurry."

After supper we entered our train, which consisted of a big engine and one car, which was baggage and third-class combined. We were at the mercy of the Cumberland Coal Company, which owns a bit of road running from its mines at Springhill north five miles to meet the Intercolonial rails in the wilderness where we were waiting, and south twenty-seven miles to Parrsboro on the Basin of Minas, near Blomidon.

Darkness was coming, yet still we waited. Presently a message came. The coal king or his viceroy had perhaps finished his supper, and remembered to release us. Yes, we were to wait no longer for the Moncton train, but to start for Springhill. The road was ballasted with soft coal dust; even the hollows were filled with wasted fuel, which was cheaper for the purpose than gravel. The conductor came in, and I asked him about Springhill. What was it like? "A coal-mining town, with thousands of miners, pits, shafts, dirt, poverty, and the memory of the horror of three years ago, when scores of widows and hundreds of fatherless children wept and wailed round the pit mouths after the explosion which suffocated their bread-winning husbands and fathers." "And must we stay there all night?" He hesitated. "Perhaps not; an engine may be run down to Parrsboro with some freight cars. But the lady?" and he looked inquiringly at my wife.

Soon, through the dismal rain and smoke, we saw the flaring lights near the pits, and heard the throbbing heart of the great mine-pump. A few dim lamps burned in streets or dingy windows, but the town looked smothered in wet coal dust and misery. A whisper came in my ear, — "Better to ride to Parrsboro on the engine than to spend a night here;" and my heart assented.

We and our trunk were turned out upon the dirty platform, and lanterns were held close to us, while Springhill inspected its unwilling guests. I pleaded with the railway men, the conductor, the engineer, and the fireman. Might we not ride on the engine, in a freight car, somewhere, anywhere, rather than stay here? They consented, and an engine came clanging out of the blackness, with a freight car attached. Into this freight car we and our trunk were put, and left there in utter darkness, alone with the steamsteed, and he ready to leap southward on his wet rails the moment hand touched the lever. The rain splashed on the roof, wind wailed through sheds and cars near us, flames flickered round the pit's mouth, and the throbbing pump kept on with its wearisome pulsation, until our hearts and lungs seemed forced to keep time with its rhythm. Then a lonesome watchman came and talked to us, and left a lantern, which sputtered, smoked, and went out. After a long interval a big miner came and sat with us. He told grewsome tales of the explosion. "Them doctors they had were to blame for many a good man's death. They looked at the boys as they hoisted them up from the pit, and said 'Dead,' when they was n't no more dead than we be this night. They did n't know what they was talkin' about. Some of us took a young fellow they

said was dead, and we covered him over with dust and let him lie till the damp was drawn out of him, and he 's walkin' round with the best of us to-day. The damp was in them, — that was all, — and the doctors did not know how to draw it out."

The man's deep voice was full of mournful feeling, the darkness added pathos to his story, and the pump with its never-ending beat seemed to bear witness to all he said. More than an hour had passed, and still we sat and waited; but the end was near. The engineer passed, and gave a word of cheer. Then the conductor climbed in beside us, and we were off. It might have been down the bottomless pit's own mouth that we were tearing, for all that eye or ear could tell. Forest hemmed us in, and intense darkness hung over us. Occasionally, when coal was hurled into the fire, a spasm of red light passed over the whizzing gloom outside; but it only made our eyeballs weary, for we could distinguish nothing. Perhaps we went a mile a minute; perhaps not. Freight cars have no tender springs, yet the motion was not especially uncomfortable until we began to slow up on nearing Parrsboro. Then dislocation was threatened; but a moment later we were using our trunk as a step to dismount on, and saying a cheerful good-night to our companions.

Parrsboro harbor at low tide is a sight to behold. Coming from the Bras d'Or, where the tide rises only a few inches, to the head of the Bay of Fundy, where it rises thirty feet, made us feel as though something must be wrong with us or the moon. The wharves reared themselves upon a forest of slimy piles, and far below them, reclining in all kinds of postures upon the mud, were sailing-vessels of various sizes. A schooner, ready for launching at two P. M., was perched upon such a height that it was easier to believe that it was to be launched into space than into water which was to come from some unknown point, and in a few hours fill this empty harbor to its brim. However, the tide came in, not like a tidal wave, with a solid front, a hiss, a roar and rush, as I had always imagined Fundy tides to appear, but little by little, as though it were trying to catch us unawares in its horrid depths. Of course we saw the launch, and felt a thrill as the clumsy little tub darted down the greased track, and became rather a graceful creature when fairly afloat. The tub's first step in the world was not wholly dignified. When the last prop had been knocked from under her, and she still sat motionless in her bed of cold grease, the master workman cried out, "Shake her up, boys!" And forthwith the five-and-twenty urchins on her decks rushed up the rigging, and

swayed and yelled, until their kicking gave the desired start to her career.

The launch was on August 15, and it was on the following morning, immediately after breakfast, that we resumed our journey by driving across the neck of land which leads from Parrsboro to Parrsboro Pier and Partridge Island. We wished to reach the shore of the Minas Channel at a point where we could look directly down the Bay of Fundy between Cape Split and Cape Sharp. The mingling of sea and land in this region affords endless temptation for sketching. If it were a part of the United States instead of being, nationally, neither fish, flesh, nor good red herring, it would be one of the favorite resorts of our amateur artists and summer tourists. As matters stand, Blomidon on the one shore, with its forest-crowned palisades reaching down to Cape Split, and on the other Partridge Island, with sculptured rocks around which the tides of Fundy surge and eddy ; Cape Sharp, red-walled and spruce-capped ; and even Parrsboro itself, where one must eat and sleep, are places hard to reach promptly and comfortably. We had been forced to storm Parrsboro by night in a rain-soaked freight car. We escaped from it by a steamer so tiny and primitive in form that I wondered whether it had not in years past seen service as a towboat in New York harbor.

From the hillside above Minas Channel we saw several large ships lying at anchor in the protected water between Cape Sharp on our right, westward, and Partridge Island on our left, eastward. The tide was coming in beyond them, and even at a distance the channel seemed like a river flowing from Fundy into Minas Basin. To gain a nearer view of it, and a slightly different outlook, we drove along the shore until we reached Parrsboro Pier, which is in a sheltered nook under the lee of Partridge Island. The tiny tub which was to take us across to the Blomidon side lay at the foot of the pier, waiting for the tide to lift it high enough for passengers to find it. From the pier a ridge of pebbles runs across to Partridge Island, and on this natural causeway we strolled over to nature's Mont St. Michel, with its grottoed cliffs rising on high from the raging waters, and its dark pinnacles of spruce piercing the sky. A winding avenue leads through moss-bearded trees to the island's summit, ending upon a grassy shelf where the rocks overhang the channel, and where either folly or courage is needed to induce the visitor to stand upon the dizzy brink and look down, down, into the hurrying, eddying tide below. My childish imaginings of Fundy tides were all satisfied here, if they had been disappointed in Parrsboro harbor. The eager rush,

whirl, and hiss of that vast mass of water, as it surged past, told of the limitless strength of old ocean, far away at Fundy's mouth, heaving and pushing its way into bay and channel, basin and cove, with woe and destruction for anything opposing its mad progress.

Cape Split and Cape Sharp seemed monuments to the passion and cruelty of this tide. Sharp, on the northern side of the channel, rears its mangled face, and tells of ages of horrid contest with tides and storms, grinding ice below, and cleaving, wedging ice above. Split, on the southern side, is a perpetual reminder of the Micmac legends of the deeds of Glooscap. A huge fragment of the palisades — cliffs which reach from Blomidon seven miles along the Minas Channel to Split — appears at a distance to have broken from the projecting end of the cape, and to lean outward over the bay, its sharp sides rising to a toothlike point. A broad section of cliff next to it is also separated from the mass of the palisades by a deep cleft. The Micmac story runs that Glooscap, angry with the monster beaver for building a dam from Blomidon across the Minas Channel, freed the end of the dam on the northern or Parrsboro shore, so that the released waters, rushing towards Fundy, swung the dam round violently, thus forming the palisades, and leaving the broken end showing at Cape Split.

A shrill whistle summoned us from Partridge Island to the deck of the Evangeline, as the steam tub is called which sails from Parrsboro Pier, across the mouth of Minas Basin, under Blomidon, past the Pereaux shore, and into Kingsport, whence a branch railway runs to Kentville. When a series of whistles had gathered together upon the Evangeline's deck all the floating population within hearing of the pier, amounting in all to seven souls, we puffed out past Mont St. Michel into the Fundy maelstrom. Why I did not follow the forcible example of some of the passengers and retire to the dark interior of the tub for secluded misery, I know not; but I did not, and, moreover, I was not seasick a moment during the pitching and tossing which lasted until we approached Kingsport. The fury of the water which surrounded us was marvelous, considering that there were no great waves, and no storm to make waves. True, the wind blew hard, and cold rain beat upon us spitefully, stinging like hail; but it was not the wind which made the fury of the sea. Looking westward down the Minas Channel in the direction of Fundy, we saw boiling, whirling, eddying water coming towards us. We felt it, too; for when a great whirl struck the tub, its stern fell off, and its head swung round a dozen points from the true course. The visible move-

ment of separate masses of the water reminded me of White Mountain rivers in freshet time. It was uncanny, out there miles from land, to have the sea open and allow a great gush of water to rise up and spread itself out as though forced from a submarine duct. The Evangeline struggled hard with the swift current, but it carried her far out of the direct course towards Blomidon, and it was only by repeated rallies that we were kept from being swept well out into Minas Basin.

As we neared Blomidon the distinctive outlines of the noble bluff were lost. The sturdy profile fell back into line with the palisades, and it was hard to say just what part of the cliffs which we were passing furnished the bold features so familiar from a distance. A moment later, Cape Split and the distant palisades passed from view, then Cape Sharp was concealed, and soon the profile of Blomidon began to grow again, as all that lay northward and westward of it was hidden behind its simple but severe contour.

Our ever ready guide, philosopher, and friend remarked, before we had fairly set foot on Kingsport Pier, that seldom though it might be that man stood on Partridge Island in the morning and on the top of Blomidon in the afternoon, he wished us, nevertheless, to accomplish the feat.

Accordingly, dinner at the cosiest little hotel in Nova Scotia was treated with scant courtesy, and we were soon speeding over red mud roads towards Blomidon. In one place, which I remembered puzzling over, through my glass, from the Look-off, three weeks before, we had our choice of driving along the top of an old Acadian dike, or of following the level of the reclaimed *pré* just inside of it. Like our New England stone walls, the Acadian dikes are a monument to the patience of the makers of America. It is wearisome to consider the millions of hours of labor buried in such memorials.

After crossing the Pereaux valley we drew near to Blomidon, and saw the narrow red beach and water-worn cliffs extending far out into the Minas waters. The tide was falling, and by the time we had climbed the height and returned, a broad beach would invite us to explore its sticky expanse, in search of minerals of many colors. So to the top we drove, easily, for the road was well made and not steep, — at least in New Hampshire eyes. Although we were now but half a thousand feet above the waves, while at Cape Smoky we had been twelve hundred, Blomidon held its own in our hearts, and sent thrills through us by its views, westward, of the Bay of Fundy, now brilliant with sunlight; of Isle au Haut, a blue cloud in the midst of the most dis-

tant sparkling waters ; and eastward, of the fair Minas Basin, bounded on the one hand by the Cobequid Mountains, and on the other by Grand Pré, the Gaspereaux, and the hills above the Avon, yet reaching between the two to the horizon line at the point where we knew Truro lay. The top of Blomidon is not the abode of storm winds alone, for two houses stand upon it, and the laughter of children rings cheerily among the evergreen groves. Much of it is pasture land, and not for cows alone, as I discovered when a huge sow came charging down upon me with hungry gruntings. The view, taken as a whole, was much like that from the Look-off, so we spent only a few moments on the summit, and then hastened to the beach below.

The road led directly down to the edge of the sea ; so, defying Fundy tides, knowing this one to be still falling, we drove along the beach, until our horse's feet became balls of red mud, and the wagon wheels threatened to turn no more. Then we left the horse tethered to a stone, and picked our way beneath the sculptured cliffs, searching for amethyst, jasper, agates, and salmon-colored masses of fibrous gypsum. The cliffs were soft red sandstone with many layers of gray intermingled, and erosion had worn their faces into columnar forms of singular grace and beauty. At intervals, hun-

dreds of pounds' weight of gypsum had dropped upon the shore, and been beaten into fragments by the sea. The beach was about half red mud, and half small stones and pebbles. Of pretty stones we could have carried home a ton, but of crystals or minerals of real interest we found few. The shore is as carefully gleaned for amethyst as Musketaquid meadows are for arrowheads.

Dewy twilight surrounded us before we could tear ourselves away from the fascination of the towering cliffs, red beach, purple shallows, and lapping waves. When we climbed back into the wagon, it was with the feeling that the spell of Blomidon and Smoky, of Minas Basin and the Bras d'Or, was broken at last, and that our faces were set in earnest towards Chocorua.

AUGUST BIRDS IN CAPE BRETON.

After traveling for two weeks through Cape Breton, on rail, steamboat, wagon, and my own legs, I felt sure that its distinctive tree was the spruce, its prevailing flower the eye-bright (*Euphrasia officinalis*), and its most ubiquitous bird the junco. Certainly three more cheerful, sturdy, and honest elements could not be woven into every-day life, and they seem to me to be emblematic of the island province and its people. The junco was everywhere, in sunshine and in rain, at gray dawn and after dewy eve; in the spruces which watched the sea at Ingonish, and in the early twilight of inland Loch o' Law. He, she, and the infant juncos were at the roadside, in the fields, in the pastures, on the mountain top, and by the trout pool, and they were always busy, happy, and treating their neighbors as they liked to have their neighbors treat them, like brothers. These neighbors included song sparrows, white-throats, grass finches, yellow-rumped and black-and-white creeping warblers, blackcapped and Hudsonian titmice, some of the thrush family, and occasionally pine siskins.

Of the thrushes, the robin was by far the most numerous, noisy, and generally distributed. He was not, however, a bird of the lawn, the orchard, and the shade tree by the house door, but by preference a dweller in larch swamps and spruce thickets, secluded river beds and upland forests. He was the first bird in every lonely grove or deep wood vista to give a note of alarm and warning to the neighborhood; and the first to respond to a cry of fear or pain uttered by any other bird. The hermit thrush was present in fair numbers, and blessed the woods and pastures with his anthem. I saw Swainson's and gray-cheeked thrushes, but the catbird and thrasher were apparently unknown, as was also the veery. The robin's conduct made me feel as though he were not one and the same with the common New England dooryard birds, but of a race as different from theirs as the Cape Breton Highlander's stock is from that of the matter-of-fact Scotch mechanic of the cities. The people round Loch Ainslie and between Cape Smoky and St. Anne's Bay speak and think Gaelic; and the robins in the Baddeck and Margaree woods speak and think a language of the forest and the glen, not of the lawn.

One evening, as I lay on the sandy shore of Loch Ainslie, close to the mouth of Trout Brook, the spotted sandpipers of the lake told me a se-

cret of their little lives which seemed well worth knowing. The evening air was full of rural music: the tinkle-tankle of cowbells; the clatter of tiny sheep-hoofs speeding over the wooden bridge; the complaining of geese, homeward bound, by the roadside; and the harsh, rattling cries of the kingfishers, which, half a dozen strong, persecuted the small fry of Trout Brook's limpid waters. A school of big trout could be seen lying sluggish at the bottom of the brook, and their little kinsfolk were jumping freely in all parts of the quiet water. Tiny flies hovered over the pools; and if they touched, or almost touched, the water, agile fish flung themselves into the air after them. Again and again I cast my feathered fly upon the ripples; but as no answering rise pleased my expectant nerves, I tossed my rod aside, and drifted on towards evening with the stream of life and light and color flowing over me. The bell-cow came to the stream and drank, then passed slowly up the road homewards; a lamb, whimpering, followed his woolly parent to the fold; the geese, with outstretched necks and indignant heads, scolded all who passed them; and suddenly an eagle with mighty wing came sailing towards me across broad Ainslie's ripples, bound for his mountain loneliness. The sun had sunk below the western hills, — hills from whose seaward side Prince

Edward Island could be seen as a long, low haven for a sinking sun to rest upon; the sky was radiant with color, and the lake's slightly ruffled surface took the color and glorified it in countless moving lines of beauty. From the gold sky and over the gold water the black eagle came eastward, swiftly and with resistless flight. Nearer and nearer he came, until his image dwelt for a moment in the still stream, then vanished as he swept past above the bridge, and bore onward to the dark hills clad in their spruces and balsams. He seemed like the restless spirit of the day departing before the sweet presence of sleepy night.

Below the bridge, Trout Brook runs a score of rods between sandy beaches to a bar which half cuts it off from the lake. Upon this bar sandpipers were gathering by twos and threes, until their numbers attracted my attention. I strolled slowly towards them, crossing wide levels of sand, from which coarse grasses, sedges, and a few stiff-stalked shrubs sprung in sparse growth, and upon which a few clusters of rounded stones broke the evenness of the beach. As I drew near the margin of the lake the sandpipers rose, "peep-sweeting" as they flew, and with deeply dipping wings vibrated away over the water; heading at first towards the fading sunset, then sweeping inshore again, and alight-

ing within an eighth of a mile of me on the curved beach. Noticing that some of the birds had risen from among the grasses above the line of wave-washed sand, I lay down upon the ground, with the hope that some of them might return, and perhaps come near me. Scarcely had my outlines blended with the contour of the shore when the clear "peep, peep, peep" of the little teeterers was heard on both sides, as they came in from distant points along the shore. Sometimes twenty birds were in sight at once, flying low over the water, apparently guided by a common impulse to gain the part of the beach near which I was concealed. I lay motionless, my head resting upon my arm, only a few inches above the sand. As I lay thus, the grasses rose like slender trees against the pale tinting of the August sky, and lake, distant hill, and sky all took on more emphatic tones, and appeared to have firmer and more significant outlines.

Slowly the light faded, and the line of clearest color shrank to narrower and narrower limits along the distant hills. I had almost forgotten the birds, although small squads of them kept passing, or wheeling in upon the shining edge of wet sand nearest me. Suddenly a white object glided among the grass stems, only a few feet from my face. It paused and teetered, then slid along out of sight into a thicket of grasses.

I sharpened my vision and hearing, and found that all around me tiny forms were moving among the weeds, and that groups of birds seemed to be collecting in answer to low calls which suggested the warm, comfortable sound which young chickens make as they nestle to sleep under their mother. The sandpipers were going to bed in the grass forest, and I was lying in the midst of their dormitory, like sleepy Gulliver among the Lilliputians. I might have remained quiet longer had the peeps and I been the only living creatures on the Trout Brook beach, but mosquitoes and gnats were present, and the waving grass tips tickling my face made them appear even more numerous than they really were. So at last, when stars began to appear in the sky, I rose abruptly to my feet. Had I exploded a mine, the whir and rush which followed my arising could not have been more sudden. It was really startling, for in a second the air was filled with frightened birds flying from me towards the lake. How many there were I cannot say, nor even guess, but it seemed to me that all the sandpipers which patrolled the sandy shores of Ainslie must have been gathered together on that one small area of beach, bent on finding safety or a feeling of security in close association through the night hours.

Once or twice I have met the Hudson's Bay

titmouse in the Chocorua country in winter, but I had never seen him in numbers or in summer until I reached Cape Breton, and found him perfectly at home in its pasture and roadside thickets as well as in the deep forest. He is a cheaper edition of the common chickadee, who, on the same ground, excels him in many ways. His voice is feebler and husky. What he says sounds commonplace, and his manner of approach lacks the vigilant boldness of the blackcap. His brown head is readily distinguished from the black crown of his more sprightly relative, though it is likely to be looked at closely merely to confirm the impression already conveyed by his voice that he is not the common chickadee, but a new friend well worth knowing. Apparently, in Cape Breton, he outnumbered our common titmouse by five or six to one, yet the blackcap was generally distributed and was as numerous near Ingonish as farther south. Of the blackcap's friends, the white and the red breasted nuthatches, I saw nothing. Once at Margaree Forks I heard the "quank" of the red-breasted, but I failed to see the speaker, and had the note been less peculiar I should have doubted really having heard it.

About sunset on August 5, I was seated in an evergreen thicket a mile or more back of the village of Baddeck. By "squeaking" I had

drawn near me a mob of white-throats, juncos, both kinds of chickadees, ruby-crowned kinglets, and of warblers the yellow-rumped, black-throated green, Nashville, black-and-white creeping, and the gorgeous black-and-yellow, as well as robins, a purple finch, and some young flickers. Suddenly I heard an unfamiliar bird note, a harsh, loud call, which, without much consideration, I attributed to geese, great numbers of which are kept by the Cape Breton farmers. After an interval of several minutes the cries were repeated, and this time it occurred to me that geese were not likely to be wandering in a hackmatack swamp just at sunset, especially as the sky foretold rain and the wind was backing round into the east. So I left my thicket in search of the maker of the strange sounds. A path led through the larches to a clearing surrounded by a typical Cape Breton fence, or serial woodpile, which appeared to be built on the Kentucky principle of being "horse high, pig low, and bull proof," and consequently impregnable to turkeys, geese, and sheep. The moment I emerged from the trees a fine marsh hawk rose from the ground and floated away out of sight. While watching him, a flash of white on the fence drew my eyes to the edge of the woods, and there, to my delight, I saw five of the most charming denizens of the great northern forests: birds in

quest of which I had traveled miles through the New Hampshire mountain valleys, always in vain. As I turned, one of these beautiful creatures, with wings widespread and tail like a fan, was sailing just above, but parallel with, the fence. He paused upon it, looked towards me with his large, fearless eyes, and then noisily tapped a knot in the upper pole with his beak. "Moose birds at last!" I exclaimed, and at once felt the strongest liking for them. There was nothing in their appearance to confuse them with their wicked cousins the blue jays; in fact, I found my instincts rebelling at the idea of both being *Corvidæ*. Their large rounded heads had no sign of a crest, and the white on the crown and under the chin gave them a singularly tidy look, as though their gentle faces were tippeted. Their plumage as a whole was Quaker-like in tone, so that, considering their demure and gentle bearing, the name "Whiskey Jack," applied to them by the lumbermen, seemed to me absurdly inappropriate.

While I watched these birds, they moved slowly along the fence towards the swamp, coming nearer and nearer, and finally passing within about fifty feet of me. One of them was a young bird, with but little white on his dusky brown head; two others were females, also less white than the males. Finally they vanished in the swamp, the last bird going upstairs on a

dead tree in true jay fashion, and then plunging, head foremost, into the shadows of the grove beneath. As I left the larches behind me, the same strange, harsh cry echoed from its depths, and I accepted it as the moose bird's prophecy of impending rain. It is an odd fact that these birds die if they become chilled after being wet in a heavy rain, and on this occasion they were undoubtedly seeking dense foliage to protect them from the storm which began a few hours later.

Of the Cape Breton warblers, the black-and-yellow were among the most numerous, and by all means the most brilliant in plumage. Whenever I called the birds together, the magnolias were sure to appear, their gleaming yellow waistcoats showing afar through the trees, and contrasting with their dark upper plumage and the cool gray of their caps. One male redstart seemed the most richly marked bird of his species that I had ever met with. The black extended much lower on the breast than usual, and the vermilion which lay next it burned like a hot coal. Summer yellow-birds were common in the meadow borders, where Maryland yellow-throats also abounded; a single black-throated blue warbler appeared to me near Baddeck; one anxious mother Blackburnian scolded me in the dark forest near the falls of Indian Brook; and a few Canadian fly-catching warblers flashed in

and out among their dark evergreen haunts in various parts of the island. Watching ever so eagerly, I failed to see any blackpolls, Wilson blackcaps, bay-breasted, mourning, or yellow redpoll warblers, and it seemed strange to miss entirely the oven-birds, chestnut-sided, pine-creeping, and parula warblers, so readily found near Chocorua. These species may be known to Cape Breton, but they could hardly have escaped my notice had they been abundant.

Years ago, when houses and barns were less often or less thoroughly painted than they are now, and when overhanging eaves were common, the eaves swallow was a familiar bird in New England. Now the youthful nest-robber thinks of the mud-nest builder as a rare bird, one for whose eggs he is willing to travel many a mile. In all the Cape Breton country, where barn swallows abound, I saw but one colony of eaves swallows, and that was in a place so dirty and dreary I regret that these charming birds must always recall it to my mind. Scottsville — may the spirit of cleanliness some day come with sapolio and Paris green to cleanse it! — lies at the head waters of Southwest Margaree, within sight of the point where that restless river leaves Loch Ainslie. Opposite the village store stands an unpainted building with ample eaves, and on its northern side, crowded into a space about

thirty feet long, were one hundred of the retort-shaped mud-nests of the eaves swallows. They were placed one above another, frequently three deep. Their bottle-mouths were pointed upwards, downwards, to left, or right, or towards the observer, as the overcrowding of the tenements made most convenient. While some of the older nests were symmetrical, others were of strange shapes, dictated by the form of the building-site left to them.

Bank swallows were abundant, almost every available cutting being riddled with their holes. Near Baddeck I found one hole in a bank overhanging the waves at Bras d'Or, at a point where every passing wagon must have made thunder in the ears of the tiny occupants of the nest, which was literally under the highway. I was attracted to this nest by seeing a bird enter it. The Bay of Fundy pours its terrible tides into the Basin of Minas, and the Blomidon region presents to the turbulent waters which rush into the basin, not only vast expanses of red mud which are left bare at low water, but also cliffs of rock or red clay which resist the surging waves at high tide. In the earth cliffs, which stand as straight as brick walls above the floods, the bank swallows find houses just to their liking, and from the cliffs of Pereaux to the waving grass of Grand Pré the little fleets of these birds flit back and forth hour

by hour in the warm sunlight, or veer and tack close to the waves when chilly fogs come in from Fundy.

Of the chimney swift I saw little. He was in Cape Breton, but not in large numbers, and one or two farmers and fishermen said that he was a bird that built in hollow trees, and seemed not to know that in these times the chimney is supposed to be his chosen home. Night-hawks were abundant, especially in the streets of Baddeck, where, in the twilight, which no lamp-post rises to injure, these swift and silent fliers darted in and out among the heads of the passers by, to the bewilderment of those quick enough to see them. Probably, if I had visited Cape Breton in June or early July, I should have heard the whippoorwill; for when I whistled his song, the dwellers by sea or inland lake said, "Oh yes, we have that bird. He sings at night." To me, however, he said nothing, nor did the humming-bird condescend to make its small self known farther north than the Basin of Minas, which is a hundred miles or more from Cape Breton. Still, when I asked those who had gardens full of gayly tinted flowers if they knew the humming-bird, they always replied, "Yes, the one with the beautiful red throat;" which made me wonder why they never saw the female ruby-throat with her more modest coloring of green and white.

When I said that the junco was the distinctive bird of Cape Breton, I had in mind one rival claimant who certainly pervades the island with his presence. I well remember descending, just at sunset, into the exquisite glen of Loch o' Law, the most satisfying piece of inland scenery which I saw in all Cape Breton. As the road bent around the wooded border of the lake, seven large blue birds rose from one end of the lake, and flew, in a straggling flock, down to a spot remote from the road. They looked like kingfishers, but I thought I had learned from experience that, around small mountain lakes, kingfishers hunt singly in August. Nevertheless they were kingfishers, and they were hunting in a flock. A few hours before, at Middle River, where trout lie in shallow sunlit water over a yellow sandy bottom, I had seen a kingfisher hover above a point in the stream for several minutes. A rival flew down upon him and drove him away; but before my horse could walk across the iron bridge above the river he was back again, hovering, kingbird-like, over the same spot. At Baddeck, the kingfishers perched upon the telegraph wires, or assumed statuesque poses upon the tips of slender masts of pleasure boats at anchor. There appeared to be no point on the Bras d'Or or the fresh-water lakes and rivers of the island where kingfishers were not

twenty or thirty times as abundant as they are in northern New England.

The osprey was also common on good fishing-grounds, and scarcely a day passed without my seeing both ospreys and eagles. One afternoon, shortly before sunset, I saw an osprey rise from the Bras d'Or with a good-sized fish in his claws. I expected to see him take it to some point near by, but instead he flew westward, high above the trees, until finally he was lost in distance.

I have already mentioned seeing marsh hawks. None of the big buteos came near enough for me to identify them, nor did I see a Cooper's hawk, but, to my delight, sparrow hawks were not uncommon, and were comparatively fearless. The first that we saw were in a large field near Middle River. As we drove slowly along the road, a pair of sparrow hawks frolicked in front of us. They rose as we came near enough to see distinctly all their handsome markings, and flew airily from one perch on the fence to another a rod or two farther on. They rose and fell, tilted, careened, righted, tacked, made exquisite curves, and in fact performed as many graceful manœuvres in the air as a fine skater could on the ice, and then came back to the fence and perched again. I drove slowly in order not to frighten them, and the result was that they rose and settled again before us more than a dozen times.

Although I saw no living owls during my trip, I saw stuffed birds representing the common species, and heard stories of the daring attacks of great horned owls upon the dwellers in the poultry yard, — geese, even, included. With snowy owls, the natives to whom I spoke seemed to be wholly unacquainted.

Crows and blue jays were common in all sections of Cape Breton, but the crow grew less interesting after I had met his big cousin the raven, just as the blue jay had sunk to even lower depths in my estimation after my introduction to the moose bird. The blue jay is a downright villain, and his rascality is emphasized by the Canada jay's virtues. The common crow is shrewd, but he lacks dignity. The first glimpse I had of a raven was from the top of Cape Smoky, where, from a crag more than a thousand feet above the waves which dashed against the rocks below, I saw three large black birds come round a headland and sail upon broadly spread wings to the face of a ledge upon which they alighted. The eye often detects differences in outline, movement, and carriage which the mind does not analyze or the tongue describe. The three black birds looked like crows; in fact, the Ingonish fisherman will deny all knowledge of the American raven, and insist that there is no specific difference between what he calls

a "big crow" and any other crow. Nevertheless, something in the shape, bearing, and method of flight of the three visitors to Smoky fixed my attention several moments before a hoarse croak from the throat of one of them came echoing up the ravine and proclaimed their true character. At Ingonish they were abundant, especially near the cliffs of Middle Head, where I should expect to find them breeding if I made search at the proper season. Both ravens and crows were remarkably tame, and when I found that very little Indian corn is grown in Cape Breton, and that the people seemed ignorant of the crow's affection for sprouting corn, I felt that I had discovered one reason for their tameness. It was not unusual for a flock of ten or more crows to sit quietly upon the top rail of a snake fence bounding a highway, until a person walking or driving past came nearly opposite to them. If they were in a tree twelve or fifteen feet above the road, they did not think of flying away. Six ravens in a pine-tree on Middle Head remained quiet while I clambered over a mass of rocks less than a hundred feet from them.

In Nova Scotia I saw kingbirds everywhere, four or five sometimes being in sight from the car window at once. I felt as though in the orchard and hay country of the Annapolis Basin

the kingbirds must have discovered their chosen home. In Cape Breton, while not so abundant, they were by no means rare. On the other hand, pewees and small flycatchers were few and far between, and great-crested flycatchers, which are common at Chocorua, were not to be seen. Olive-sided flycatchers were present in various parts of Cape Breton in favorable localities; and when I heard their loud, unmusical call, coming from the tip of some leafless, fire-bleached pine, it always took me back to my first meeting with the bird high up on the desolate ridges between Chocorua and Paugus, where from the pinnacles of dead trees they scanned the air for insects, and wearied nature by intermittent cries.

Red-eyed vireos were not so numerous in Cape Breton as they are in New Hampshire, but there were enough of them to keep up a running fire of conversation from one end of the island to the other. I saw solitary vireos in several localities, one of which was a wooded pasture in Ingonish, near a small sheet of fresh water, and a hill in which the outcropping rock was gypsum. Within an hour I recognized over thirty kinds of birds in this pasture, including, among those not already mentioned in these pages, a white-winged crossbill, a chipping sparrow, and several goldfinches. This white-winged crossbill was the only one that I saw during my trip, but red

crossbills were to be met with in small numbers all through the region between Baddeck and Ingonish. The first that I saw appeared in the air over Baddeck River, just as I was driving a horse across the iron bridge which spans the river on the road to the Margaree. The wind was blowing so hard that I felt some concern lest my buggy should be tipped over; but the crossbills, with their usual appearance of having lost either their wits, their way, or their mother, perched upon the iron braces of the bridge directly over our heads, and looked this way and that distractedly, with their feathers all blown wrong side out. An hour or two later, when approaching Middle River, I noticed a flock of blackbirds in a small grove by the roadside. I got out and entered the grove. Every bird in the flock of sixteen seemed to be reciting blackbird poetry, and that, too, in the sweetest voice which rusty grackles are capable of making heard. Although, on many other occasions, I saw representatives of this species in various parts of Cape Breton, I was unable to find any of its near kindred. No purple grackles, redwings, cowbirds, bobolinks, starlings, or orioles crossed my path; yet I saw much territory in which they might, for all I could see, have been very happy, and in which song, swamp, and savanna sparrows, Maryland yellow-throats, and similar birds appeared to be established.

Cape Breton is unquestionably a favorite resort of woodpeckers, including the flicker, hairy, downy, yellow-breasted, and black-backed, and I doubt not the pileated also, although I was not fortunate enough to see or hear him. Flickers were common, and consorted much with robins, as they do in New Hampshire during their autumn migration. The hairy woodpeckers were most abundant near highways, where they frequented the telegraph poles and snake fences. As I write, I cannot recall seeing a hairy woodpecker anywhere except upon the poles and fences close to roads, but I saw many in those favored places. They were noticeably tame, as most of the Cape Breton birds were, and allowed me to drive close to them, while they tapped gayly upon the bleached poles, or scrambled over, through, and under the fence sticks. Downy woodpeckers were less conspicuous, and of the yellow-breasted I saw only one. He was a young male that had been tapping alder trunks in a thicket growing upon very damp ground, on the edge of the Southwest Margaree, near the point where it escapes from the broad waters of Loch Ainslie. Nearly a dozen trees had been bled by him or his family. As soon as I entered the thicket he flew away; and although I awaited his return as long as time permitted, neither he nor any other woodpecker

or humming-bird came to the sap fountains. One of the birds which I most wished to see in the northern woods was the black-backed, three-toed woodpecker. I searched for him near Baddeck, at Loch Ainslie, and on my journey northward from Baddeck to Ingonish, but he did not appear. One morning, during my journey southward from Cape Smoky, I arose very early and visited the beautiful falls and cañon of Indian Brook, which are about twenty-five miles north of Baddeck. In the deep woods near the falls I met three of these sprightly birds. I had concealed myself among the bushes to call birds around me, and was watching Hudson's Bay titmice, common chickadees, flickers, wary woodwise robins, juncos, and a few shy warblers, when a woodpecker cry, manifestly not made by a flicker, rang through the woods. High up on a blasted tree was a medium-sized woodpecker, somewhat resembling a sapsucker in attitude and air of being up and a-coming. I squeaked more vigorously, and he came nearer. Then a second and a third arrived, and all of them approached me with boldness born of curiosity and inexperience. They scolded and hitched up and down tree trunks, flew nervously from one side of me to the other, tapped protests on the sounding bark, and behaved in general like true woodpeckers. Differences in birds are what we

think of most in studying them; but after all, their points of similarity, especially when these points hint strongly at the identity of the origin of species, are quite as instructive, and worthy of serious thought.

Leaving the three-toed inquisitors, I walked on through the woods skirting Indian Brook, and within quarter of a mile flushed a woodcock and several ruffed grouse. Of the latter I saw a dozen or more during my rambles near Baddeck and Ingonish, but of spruce partridges I failed to secure even a glimpse, although all the local sportsmen declared them to be abundant, and as tame as barnyard fowls. At the point where the highway between Englishtown and Cape Smoky crosses Indian Brook there is a long and very deep pool. As I emerged from the woods above this pool, I saw three red-breasted mergansers swimming slowly across it. A prettier spot for them to have chosen for their morning fishing could not have been found on the Cape Breton coast. High ledges overhanging dark water, and overhung in turn by spruce and fir forest, formed a beautiful setting for the still pool across which they swam in single file, with their keen eyes watching me suspiciously. Many are the young salmon and speckled trout they cut with their ragged jaws.

Had my visit to northern Cape Breton fallen

during the period of the autumn migration, I should have seen wonderful flights and fleets of sea fowl. As it was, the species which I saw and the individuals which I met were few, save in the case of Wilson's tern, which was ubiquitous, and the least sandpiper, which in numerous flocks swarmed upon the sands. I saw also solitary and semipalmated sandpipers, greater yellow-legs, herring gulls, dusky ducks, old squaws, and golden-eyes. Blue herons were plentiful near Baddeck, as they had been on the Annapolis Basin. They formed a striking part of every evening picture, where sparkling water, tinted sky, purple hills, and gathering shadows were united under the magic words "Bras d'Or." In Loch o' Law, as the sun sank over the Margaree, a mother loon swam and dived with her chick in the placid water; but the bird which impressed itself most strongly upon my memory, during my trip, was the lonely shag, or cormorant, which I saw on the outer end of a line of rocks projecting into Ingonish Bay from the side of Middle Head. Dark and slimy, melancholy and repulsive, its head and neck reminded me of a snake or turtle more than of any genuine feather-wearer. When at last it saw me, it was to the bay that it turned for escape, and upon the waters, almost out of sight, that it settled down to rest among the waves. There is

more community of interest between this creature and the fish which swim under the waves than with the swallow which flies above them.

All told, I think that I saw eighty species of birds during my two weeks' wandering in Cape Breton. Had I taken my tame owl Puffy with me, I should doubtless have seen more, for he would have drawn many shy birds round him which found no difficulty in secluding themselves from me. The island is certainly remarkably good ground for bird study; species are many, and individuals numerous. The combination of ocean, bay, inland lake both salt and fresh, forest, and mountain is one which favors diversity and stimulates abundance.

BARRED OWLS IN CAPTIVITY.

CHOCORUA is one of the boldest, most picturesque, and at the same time one of the most southerly of the White Mountains of New Hampshire. At its southern foot are several small lakes fed by its streams. The chief of these streams is called Chocorua River, and its main lake Chocorua Lake. North of this water, fringing the river for half a mile, is a growth of yellow birch, beech, and hemlock of considerable age and size. The dainty parula is frequently seen in its gray moss. Cooper's hawks, red-shouldered hawks, and yellow-breasted woodpeckers are common tenants of its shades. On June 1, 1888, while nest-hunting in its midst, I saw a barred owl sitting on the edge of a cavity in a beech. The tree was a giant. The cavity was about thirty-five feet from the ground, on the southwesterly side, and quite large. The owl did not move, even after I threw a stick at her. Convinced that the cavity was worth exploring, I went home and returned with a friend, a ladder, and a gun. As a result two old birds were shot, and two young ones taken from the nest.

The gun was quite necessary, for my friend would have fared badly in climbing if I had not shot the old birds before they could attack him. Their threatening cries and the loud snapping of their beaks were quite enough to discourage an unarmed robber.

I wrapped the two young birds in a towel and later placed them side by side in an ordinary canary cage. They were savage, using beaks and claws vigorously. When released in my dooryard they half hopped, half flew towards the nearest tree, making such rapid progress that I did not risk their loss by a second experiment. For their permanent prison I chose a case in which a piano had been boxed. By standing it upon its end, and nailing perches at different heights, ample space was given the captives. The front of the box was barred horizontally by laths.

On what could the owls be fed? That was my first problem. Not sharing in the belief of my family that everything in feathers eats dough, I tried raw beef. The birds found it too tough to manage readily, and raw liver was substituted. Nothing could have suited them better, and for the best part of eighteen months liver and beef kidney have been the chief of their diet. For the birds' names the feminine half of my household agreed upon "Puffy" and "Fluffy."

At first the names were not of much use, for no one could tell one bird from the other, but it was not long before an event occurred which not only caused them to be readily distinguished, but led to a lifelong differentiation of their characters and careers. Puffy, or he who was thenceforth to be Puffy, caught his left wing between two of the laths, and by his struggles injured it so that it lost most of its usefulness as a wing and became rather an obstruction to his free locomotion. This happened about the middle of June, after my return to Cambridge, and I did not see the owls again until the second week in July, when my long vacation at Chocorua began. I found the birds fifty per cent larger than when I first handled them, and with tempers similarly developed. No one's fingers were safe inside the bars when the young gluttons were hungry. When satiated they were stolid, and did little beyond moving their heads and snapping their beaks. One interesting fact had been developed during my absence, — the owls not only drank water freely, but took prolonged baths whenever fresh water was given them. Their tank was a foot and a half long, a foot wide, and ten inches deep. Their reflections in this comparatively deep and dark pool greatly amused them for a time. On the arrival of fresh water Fluffy was usually the first at the brink, ready to drink several times,

and then to step cautiously in. He would test the depth before ducking his head, and then, holding out his wings, he would pump the water under them, flapping his tail and otherwise drenching himself. When thus soaked he became about the size of a plucked pigeon, the color of a crow, and a dismal object to look upon. His eyes at such times would stand out from his drenched and drizzling feathers in a most unpleasant way. This habit of bathing has been maintained in all weathers and temperatures. I have seen both birds take their plunges on mornings when the mercury outdoors was not more than 10° F. On such occasions they shiver for hours before drying. After washing, it is their habit to preen each feather in their wings and tails with great care and precision.

During the summer and autumn of 1888, and at intervals since, I have tried various experiments in feeding the owls. They reject all vegetable substances with the possible exception of cooked oatmeal, although they will sometimes play with apples, grape leaves, fresh twigs, cornsilk and husks, tearing them up solely for amusement apparently, and flinging fragments in all directions. Mice they consider a rare treat, and they swallow them without hesitation, head foremost. With birds they are equally pleased, but if one is larger than a redstart they are quite

sure to crush the skull, sometimes eating the head separately, then to pull out the stiff feathers, and after feeling of the wing joints, to swallow head foremost. A hermit thrush thus prepared is about the limit of their single swallowing power. They sometimes, especially with larger birds, devour the contents of the abdominal cavity before swallowing the trunk. When an appetizing mouthful has been started on its downward journey the expression of gluttonous enjoyment thrown into their half-closed eyes and distended mouths is something beyond words. One seems to see them taste the morsel all the way down! If a mouthful sticks at first, they jerk their bodies up and down with considerable force, literally ramming it in by concussion. Sometimes the tail of a warbler thus being lost to sight remains in one corner of the owl's mouth. The owl's practice then is to turn his head towards it far enough to twist the unwilling feathers into the middle of his tongue, and then to swallow violently, always with effect.

With great interest in the result, I placed nine live perch and bream in the owl's tank one morning when they were about three months old. They had never seen fish before. As the light played upon the red fins and bright scales, the birds' excitement was amusing to see. In a very short time, however, they plunged feet fore-

most into the water, and with almost unerring aim lanced the victims with their talons and flew out with them. Then the head was crushed at its junction with the backbone, the spines were bitten into jelly, and the fish was swallowed. I have seen half a dozen small hornpout caught, disarmed, and swallowed by them in a comparatively short time. Generally all the fish in the tank were caught and killed before any were eaten. Live frogs called for more agility than live fish. When placed on the bottom of the cage or in the water tank, the frogs seemed to realize their danger, and as a rule remained motionless. The owls would hang their great heads towards them, and eye them intently. The faintest sign of life would lead to a pounce or a desperate chase round the cage. When caught, the frog was subjected to a careful overhauling. Every joint was felt and crushed. As they slid the slippery legs through their beaks they seemed to be searching for spurs or horns which might prevent easy swallowing. Once found spurless, the frog soon vanished. The wood frog seems to be their favorite species, and the leopard frog the least well flavored. Once Puffy caught a toad in the grass, but the creature apparently tasted so unpleasant that it was quickly dropped, while for several minutes the owl hopped about shaking his head and making

motions with his mouth expressive of disgust or even pain. A small salamander was eaten without hesitation.

Once, when unusually hungry, the owls devoured more than a pint of large, fat earthworms, taking them from my fingers, or picking them up singly with their claws with wonderful dexterity. A plump slug was taken readily by Puffy, but almost instantly flung from his mouth with disgust. Fresh water mussels, abundant in Chocorua Lake, were taken with some hesitation and, I fancied, made Puffy miserable.

Flies, harvest flies, dragon flies, grasshoppers, and beetles of various kinds all proved enjoyable tidbits, but of snakes and turtles the owls stood in terror during the summer of 1888. The appearance of either led the birds to make desperate efforts to escape between the upper slats of their cage. What was my surprise then, in the summer of 1889, to find that so far as snakes were concerned, timidity was changed to curiosity, and curiosity quickly transformed into an eager desire to catch, kill, and swallow. Even a dead milk snake, three feet long and fat, was eaten piecemeal until only the well-picked skeleton remained. This was done in August, 1889. Small green snakes were seized by their middle and swallowed doubled, while still writhing.

Generally fresh meat is greatly preferred to

that which is stale. I have seen both owls retire in disgust to the top of their cage when some thoroughly offensive liver was offered them. On the other hand they devoured the skinned carcass of a broad-winged hawk when it was in almost as advanced a stage of decay, and once recently, when I placed a piece of luminous kidney in their closet at night, Puffy instantly pounced upon it. I have no doubt from other experiments that the light of the decaying meat, and not its smell, was what attracted him.

On one occasion I found a large number of mice in a barrel of excelsior. Carefully taking out most of the packing, I placed Puffy in the bottom of the barrel. The mice spun round him in confusing circles, but with great coolness he caught one after another until nineteen were disposed of. The owls between them ate the entire number within six hours. Puffy is also expert in catching and killing chipmunks, when placed with them in a barrel. After seeing one or two let out of a box trap for his benefit, the sight of the trap was enough to bring him to the door of the cage ready to act as executioner. The junction of the head and body of a vertebrate is the point always chosen for the first effective use of the beak. The struggles of a dying victim seem to cause a certain cat-like excitement and pleasure.

During the warm months the owls require food daily, and in considerable quantities. As cold weather comes on, their demands grow more moderate, and in midwinter they eat little and seem drowsy most of the time. Once or twice I have failed to feed them for nearly a week after giving them a hearty ration. In summer, when fed frequently, and on mixed animal food, they often eject from their throats round pellets made up of the bones, hair, feathers, or other undigested portions of their preceding meal. Once or twice these ejections have been extremely offensive in odor. When hungry the owls betray the fact by whining cries. When fed, if both secure a hold on the first piece of liver, a spirited tug of war ensues, wings, beak, free foot, and tail all being used to gain ground. During such a scrimmage a queer chattering with an undertone of angry whining is kept up, but I never have seen either bird attempt to wound or really injure the other. Food not required by one of the owls for immediate use is always hidden in a corner, and often guarded with care against appropriation by the other.

Contrary to my expectations the owls are not appreciably more active in twilight hours than at other times, and I think they are quiet, possibly asleep, at night. I am certain that in an ordinary degree of darkness they cannot see. If

the light goes out while Fluffy is flying in my cellar in the evening, he is sure to crash into something or fall heavily to the ground. I have held Puffy close to a cat in the dark, and he was wholly unaware of her presence. Neither of them has ever shown a dislike for sunlight, and, as will be seen hereafter, they can see without difficulty in the face of the brightest natural light. While watching anything which interests them they have a most characteristic habit of throwing their heads far forward and then swinging them about like signal lanterns, or waving them back and forth and up and down, as if seeking the clearest avenue of vision to the object of interest. This trick is probably due to their ancestors' peering through thick branches in search of prey.

About the third week in September, 1888, the owls were sent by freight from Chocorua to Cambridge. The journey failed to disturb them, and they took kindly to city life in a sunny corner of my cellar. Their near neighbors were my hens, who resented deeply my early experiments in letting the owls out in their narrow dominion. The hens fought them bravely when brought to close quarters. My first test with the owls at liberty proved that they neither feared me nor desired to attack me. They recognized me as their caterer, and hailed my ap-

proach with noisy demands for food. I began handling them with heavy gloves which their beaks and talons made little impression upon. Gradually I came to use my bare hands, and with Puffy especially I was soon on familiar terms. The way in which I accustomed him to handling was by first rubbing the top of his head with one finger, and then softly rubbing the back of his head and neck with my finger tips. During the process he seemed almost mesmerized, although occasionally he would recover himself and make a swift snap at my retreating fingers. In the course of a few weeks I gained sufficient influence over both birds to carry them about with great freedom, always beginning by pushing their heads down, and then clasping them round their bodies just below the wings. If turned on their backs while thus held, they remain entirely quiet.

During the greater part of the long winter I keep them in a closet in my main cellar. I found to my cost that I could not keep them in the sunny cellar where my hens were, for the reason that they caught and ate some of my pullets and terrified the survivors so that their lives were a burden. Their only delicacies in these months are mice. Their attitudes in chasing a dead mouse dragged over the cellar by a string are striking. Fluffy sails noiselessly over the ground

with feet pointed forward and claws ready to close; but Puffy, unable to fly, stalks across the floor, his head pushed forward, and his feathers drawn away from his legs.

As the spring of 1889 came on, the owls became tuneful after their kind. The quality of their sounds suggested feline music, while their accent and metre often aroused my roosters to responsive crowing. They seldom hooted more than once or twice, and then in the early evening.

With the coming of warm weather and the return of birds in the spring of 1889, I began a series of experiments with Puffy which proved of considerable interest. I had found that he was willing to be carried about while perching on a short stick. Taking him in a basket to some woods in the suburbs of Cambridge, I displayed him to the robins, pigeon woodpeckers, vireos and warblers which chanced to be at hand. No impressario ever was more delighted at the success of a new star. A full house gathered at once. Armed with a field glass I had the satisfaction of studying at short range the whole bird population of the neighborhood. The robins, brown thrushes, and pigeon woodpeckers were the noisiest, the oven-birds and red-eyed vireos the most persistent, the chickadees the most indignant. The woodpeckers went so far as to fly past the owl so close as to brush his feathers

and make him jump at each charge. On May 12, during a three hours' walk, I saw over forty species of birds, many of which I had unusual and ample time to study through my glass, thanks to their interest in the owl and consequent indifference to me. It was not, however, until my long vacation in Chocorua, beginning July 6, that I really had time to ascertain the full value as a magnet of my patient little bird companion. The owls made the journey back to the mountains with perfect composure. On being returned to their piano-box cage they promptly sought their respective corners, and showed in many ways their recognition of old surroundings. This power of memory was even more strongly shown on their arrival in Cambridge in October, 1889, when Fluffy flew across the cellar in search of a favorite perch which had been removed, and the absence of which caused him to end his flight in an ignominious tumble.

On my arrival at Chocorua I began to keep systematic account of all birds seen each day, making careful allowance for birds seen twice in the same day. Between July 6, and Oct. 14, I recognized 9782 birds, representing 95 species. On nearly half the days in this period Puffy was my companion on my walks and rides. At first it was not easy to induce him to leave his cage and accompany me, but after a few lessons he

consented to step from his perch upon the short pine stick on which I used to carry him, and to remain clinging to it while I walked or ran, scrambled over ledges, or forced my way through thickets and brambles. He went more than once to the heights of Chocorua; passed hours traveling through dark woods and high pastures; or perched resignedly on the sharp prow of my Rushton boat, watching dragon-flies skimming the surface of the lake, and his own image reflected in the water. In the woods, if I held him too near a tempting log or projecting branch, he would hop off. Sometimes he would weary of my walking, and, jumping to the ground, would scurry away to cover and snap his beak angrily if I poked his perch in towards him and told him to "get on." As the summer wore on he grew more and more obedient and less inclined to nip my fingers on the sly as he had a way of doing when I first carried him about. This winter I have trained Fluffy to step up beside his mate and submit to being carried around the house on a perch.

Whenever on my summer walks I came to a spot which I wished to "sample" for its birds, I would place Puffy on a bending sapling, and, hiding in the neighboring foliage, I would "squeak" by drawing in my breath over the back of my hand, to attract the attention of any birds

which were near by. Usually in the deep woods the first comer was a red-eyed vireo, chickadee, hermit thrush, or oven-bird; but whichever it chanced to be, an alarm was almost sure to be given that would bring birds from all directions eager to see the cause of disturbance. Even when I was imperfectly concealed, the irritated crowd paid little attention to me, provided I kept reasonably quiet. Sometimes I would leave the owl in comparatively open ground on a boulder in a pasture, or a stump in a meadow. Then his favorite position was with his head tipped directly backward and his eyes, half closed, fixed either on the sun or a spot not ten degrees from it. I never could fully understand this attitude, but I soon found that the owl was keenly alive to anything passing skyward, for if a hawk or crow came into view far away in the deep blue, Puffy's gaze was instantly turned full upon the growing speck, the eyelids partly closed and a most intent look coming into his eyes. Again and again Puffy has seen hawks or gulls overhead which my eyes, although unusually far-sighted, have at first been unable to discern. On one eventful day he showed me 334 hawks sailing southwest under the pressure of a stiff northeast gale. It was September 10, one of the later of the days when the fires were raging among the forests along the St. John River. The hawks were

most of them flying very high. I saw none before 9 A. M. or after 2.15 P. M. I think Puffy saw every one of them. It mattered not whether they came singly or in bunches of twenty to forty, his ever ready eye was upon them as soon as they came into view. In spite of this marvelous power of detecting moving objects in a bright light, my pets often utterly ignore some dainty morsel merely because it does not move. Their sense of smell is either weak or uncertain in its action. Their hearing on the other hand is acute, although not depended upon in the same degree as their sight.

Of the various families of birds which Puffy annoyed during the summer of 1889, none were more distressed and angered by his presence than the woodpeckers, thrushes, and vireos. In every hemlock swamp the yellow-breasted woodpeckers and flickers said their say against his character with petulant emphasis. The flickers often flew close to his head. Downies and hairies liked him no better, but were less demonstrative. It was when a venerable and fiery-tempered logcock caught sight of him on August 21, that the full force of woodpecker eloquence was let out. Puffy seemed to recognize a hereditary foe, for before the pileated came into my view, the owl suddenly changed his appearance from rough-feathered and sleepy

content to an astonishing resemblance to an old moss-grown stump. He effected the transformation by standing up very straight, nearly closing his eyes, and making his feathers lie absolutely sleek against his attenuated body. Once on another occasion when he ran away from me, he climbed to the top of a small oak stump and made himself look so like a continuation of it that I passed him four times without detecting his presence. Not so the pileated, for with a shrieking cackle, his crest gleaming in the sunlight, he flew at the owl so savagely that I expected to see my pet slain on the spot. He only ruffled Puffy's feathers, however, and made the poor bird unhappy for some time by his discordant cries and frequent flights and counter flights.

Of the thrushes, the robins took the owl most to heart. More than once in black cherry time I have seen sixty to a hundred of them within twenty-five feet of him. Their blended cries always drew hermits and Swainson's from the woods, cedarbirds from their cherry feasts, and detachments of warblers from woods and meadows. The veeries seemed to care least about their enemy; the hermits said little, but did some hard thinking. The Swainson's, especially after sunset, had a good deal to say in a refined way, flirting wings and tail meanwhile.

The numerous catbirds and occasional thrashers were coarsely abusive. Through it all Puffy made no remarks, and seldom stirred; he found out long ago that he could not catch birds.

The ubiquitous red-eyed vireo never wearied of staring at Puffy, and firing at him his suspicious, expostulating "cree!" By roadside and meadow, upland pasture, and in the deeps of the beeches, the red-eye was always present. Even in the haunts of the juncos and white-throated sparrows on the high ledges of Chocorua he was not absent. My count of birds in July showed him to be inferior in numbers only to the barn swallow, the cedar-bird, and the robin. Far less numerous, but a leader among the haters of the owl, was the blue-headed vireo. I had seen little of the bird in previous seasons, but Puffy seemed to draw one or more of them from every considerable area visited. Their scolding reminded me of an angry June-bug in a bottle.

As a rule the sparrows cared little for the owl. Purple finches would come and look him over, the female making a sweet little note of inquisitive protest, and then go away. Goldfinches did about the same, showing no anger. Grass finches sat about on boulders and said little, and their friends, the field sparrows, behaved similarly. In large swamps one or two

rose-breasted grosbeaks generally came to see what caused so much outcry, but they never approached close to the owl. During the flight of juncos, white-throats, and white-crowned sparrows in October, these species seemed to care almost nothing about Puffy after a first bustling visit of inquiry.

A bird of great individuality and irregular distribution is found quite abundantly in the Chocorua country. I refer to the great-crested flycatcher, which, by the way, has always placed snake skins in those of its nests that I have found. No amount of bird clamor will bring this self-contained and suspicious citizen near my owl. He has his own affairs to care for, and he has a contempt for brawls and gossip. Similar indifference was shown the owl in a less marked way by the smaller flycatchers, but the kingbirds maintained their reputation for bullying by attacking Puffy and striking him lightly again and again by well-directed darts from above.

The swallows and swifts delighted to tease the owl by dashing past him and fanning him with their wings. They showed no fear or hatred. Kingfishers took no notice of him. The black-billed cuckoo came near, and had a good deal to say in a reproachful voice, but its controlling emotion seemed to be curiosity rather than fear. Late one afternoon in August (the 2d), I placed

Puffy in the midst of a white birch grove near a brook. A cuckoo opened the opera and brought some vireos, including two solitaries. Their explosions were audible a long way, and for a moment or two the air seemed full of birds, nearly all warblers, and all coming towards the owl. I could not count them; they came by scores and swarmed about incessantly like bees. Most of them were black-and-white creepers, black-throated greens, chestnut-sideds, black-and-yellows, canadians, and redstarts, young birds predominating. I never expect to see more warblers in one noisy bunch. As a rule, however, a glance or two seemed to satisfy them, and they went off after their suppers. Of all the warblers, the oven-birds were the only ones at all persistent in abusing Puffy. They would come quickly and stay long, with ruffled feathers and anxious notes. One day (July 14), while exploring some dense spruce thickets on a high ridge of Chocorua, I came across a pair of black-poll warblers. They were much excited by the owl and joined with juncos and white-throats in prolonged complaining at his presence. A white-winged crossbill, flying by at the moment, alighted and looked us over, but was apparently not at all interested in Puffy.

Another bird which never showed any special emotion on seeing the owl, no matter what the

season, was the scarlet tanager. As a rule it took no notice of the owl's presence. Cedar-birds were similarly indifferent even when the owl was near their nests or young.

Crows and blue jays showed great hatred of the owl. In the late summer the jays prowled about in considerable flocks. By "squeaking" I could draw them near enough to see the owl, and then the harshest and most violent kind of bird abuse would be poured out on Puffy's head. Jays certainly have a broad knowledge of profanity. The crows were scarcely less demonstrative; circling low over the owl, they made the woods ring with their angry clamor. I found that I could attract them by hooting like my pets.

As a rule the hawks cared little for the owl. I shot one young Cooper's hawk near its nest because my calling and the owl's moving about induced the creature to fly up, tree by tree, until within range. On July 23, while "squeaking," I was astonished to see a sharp-shinned hawk make a dash at Puffy, scaring him into his stump-like condition of plumage and attitude. I continued to "squeak," and the hawk flew straight at my head, grazed my face, and alighted near by. Soon a second came, but was more wary. I amused myself with them for half an hour, and again on another day a week later. On no other

occasion do I remember a hawk's taking any notice of Puffy, although in many instances he has betrayed their presence by his change of shape and expression. Once while walking with him along the shore of Chocorua Lake he changed his whole appearance in the twinkling of an eye, and as I turned to follow his gaze I saw an eagle strike the water near by, dashing the foam high into the air.

About sunset on August 12, 1889, I heard a barred owl hooting near a small lake close to the foot of Chocorua. Two of us set out at once with guns and reached the crest of a kame near the lake just as the moon rose. After waiting quietly until weary, I began hooting, and to my surprise and delight an owl responded from a tree close by. I hooted again; it came nearer. Then I "squeaked," and the next second I hastened to hide my head in the bushes, for the wings of an owl had brushed my face in the darkness, making cold shivers run down my back. We fired three times at this owl and another which joined him, but failed to kill either. After amusing myself and others several evenings by calling the owls in this way, I took Puffy with me and placed him on a swinging bough where he was plainly visible to crepuscular eyesight. Several Swainson's thrushes found him out before twilight faded, and com-

plained softly at his presence. When all was still, I hooted, and soon an owl replied from the farther shore of the lake. Continuing to call, I had the satisfaction of seeing my bird fly close over Puffy's head and alight within easy range, another owl at the same time beginning to hoot close by. I shot one and was satisfied. Puffy and Fluffy always show great excitement when wild owls hoot at night, and occasionally Fluffy replies.

The only other owl which I have seen thus far in the Chocorua region is the Acadian. On July 18, about six P. M., listening to four great-crested flycatchers signaling each other in a wooded pasture, I noted an unusual commotion among robins, hermits, and vireos in a bunch of alders not far away. Creeping in, with Puffy held before me, I saw the scolds surrounding a buff-waistcoated young Acadian perched about five feet from the ground on an alder. He saw Puffy, and Puffy looked at him with interest and attention. The agony in the little bird's yellow eyes was pitiful. He gazed long, and then, turning his head slowly away, sailed noiselessly out of sight, followed by the gossips.

There are several of the Chocorua birds which I have not named in connection with the owl. The bluebirds seemed grieved to think anything so wicked could exist. They perched near him

and seemed to be trying with their sweet tones to induce him to give up being an owl. The kinglets cared nothing for him, even when their curiosity was aroused by the abuse of chickadees, who were among the noisiest of Puffy's visitors. Both nuthatches are common near Chocorua, and both showed by brief, business-like remarks what they thought of Puffy. Winter wrens told Puffy plainly that he was a thief. The indigo-bird was one of the few finches which seemed much disturbed by him. The towhee showed moderate excitement. The *Icteridæ* (American starlings), are uncommon in the Chocorua region, and none of them met Puffy in his native meadows. About Cambridge, however, orioles, redwings, crow blackbirds, and cow buntings all showed marked excitement and anger at his presence. Night-hawks and whippoorwills have not met Puffy. I hope next summer to arrange an interview with a whippoorwill who haunts my pasture bars. Once or twice humming-birds have buzzed a moment near Puffy's head, as if adding their small tribute of hatred to the general estimate of his character.

None of the few species of game and water birds found near Chocorua Lakes have seemed to show any interest in the owls.

I have recently taken Puffy to Chocorua in the season of snow. Of the eight species of birds

met, only four saw the owl. They were chickadees, red-breasted nuthatches, redpolls, and blue jays. They all scolded him, but not with the average summer emphasis. The redpolls showed only mild curiosity which soon expended itself in gentle reproachful phrases. Puffy did not mind cold, but the light from the snow seemed to blind him. Indoors he held two young hounds at bay, and made their lives miserable by refusing to allow them to come near his corner without risking an attack from his beak and claws. With dogs and cats outdoors he always shows fear unless they come to close quarters; then, as indoors, he spreads and arches his wings, raises his feathers on his back, lowers his head, and snaps his beak, sometimes making swift rushes with an expression so fierce that I have yet to find any quadruped willing to defy him.

SAPSUCKERS AND THEIR GUESTS.

Of the seven species of woodpeckers which I have found in the region of Mt. Chocorua, New Hampshire, the yellow-breasted or sapsucker is the most numerous. It may fairly be said to be abundant in that district. I base this statement upon my daily count of birds seen between April and the middle of October in the years 1889 and 1890. I frequently record seeing from seven to ten of these birds in a day. Their favorite haunts are mixed growths of young birch, larch, hemlock, maple and white ash bordering water or wet lands.

My attention has been drawn to the yellow-breasted woodpeckers on two accounts, — their quickness to observe and persistence in scolding my tame owls when in the woods; and their destruction of certain forest trees.

During the summer of 1890, I was led to spend a considerable time in close study of these woodpeckers and their feeding habits, by the peculiar relations which I noticed as seeming to exist between them and humming-birds. My observations were given point by my recollection of the

difference of opinion among ornithologists regarding the diet of these woodpeckers and their motive for tapping sap-yielding trees. I had heard it said that their sole reason for drawing the sap was to attract insects which they then fed upon. I had also heard that they ate the tender cambium layer which intervenes between the bark and wood of trees. I knew well that the birds were insect-eaters, for I had often seen them fly into the air with the grace of a tyrant flycatcher or cedar-bird and capture insects on the wing.

On July 19, while watching a group of birds gathered in the woods around my tame owl, Puffy, two yellow-breasted woodpeckers and a humming-bird attracted my attention. The woodpeckers were scolding the owl, when the humming-bird darted towards one of them, hummed before it, rushed at the other, and then seeing the owl flew at him squeaking furiously. Then it flew back to the first sapsucker and perched near it. On the 21st, I returned to the spot and found near by a sapsucker's "orchard" of about a dozen canoe birches and red maples, most of which were dead, some decayed and fallen. The tree most recently tapped was a red maple about forty feet high and two feet through at the but. The drills made by the woodpeckers began eighteen feet from the ground and formed a gir-

dle entirely around the trunk. This girdle contained over 800 punctures and was about three feet in height. In places the punctures or drills had run together, causing the bark to gape and show dry wood within. The upper holes alone yielded sap. From this I inferred that what the birds obtained was the elaborated sap descending from the leaves through the fibres of the inner bark. I tasted the sap and found it unmistakably sweet. The leaves on branches above the drills drooped; those below were in good condition. I watched the drills on this tree from 12.30 P. M. until 2, and from 4 until 6. I was concealed in the bushes to the northwest of the tree. During almost all of this period of three and a half hours one or more woodpeckers were in the tree engaged at the drills. They were a male, female and two young birds. Four visits were paid by humming-birds in the time named. The visitors were driven away by the woodpeckers. At 5.30 I shot one of the young birds in order to determine the number of individuals using the orchard. His absence was unnoticed by the survivors.

The next day, July 22, I watched from 9.30 A. M. until 1 P. M. The male, female and one young bird were present, the tree being seldom left by all at once. Ten visits were paid by humming-birds; in five cases the birds reached

the drills, and hovering, drank sap from one or more of them. In the other cases, the woodpeckers being present, the hummers were driven away. The work of the woodpeckers seemed to me, armed as I was with an excellent opera glass, and sitting not more than thirty feet from the drills, to be perfectly plain in character. During the morning the female drilled four or five new holes. They were above others in perpendicular series. They yielded sap freely. She was closely attended by the young one, who occasionally swallowed pieces of the soft bark or cambium layer taken from the bottom of the drills. The female also ate some of it. When not drilling or resting, the female dipped sap from the holes near by. The male drilled no holes but dipped in those yielding sap. The dipping was done regularly and rather quickly, often two or three times in each hole. The sap glistened on the bill as it was withdrawn. I could sometimes see the tongue move. The bill was directed towards the lower, inner part of the drill, which, as I found by examination, was cut so as to hold the sap. I looked carefully again and again to try to find insects in the sap, but none were there although numbers crawled upon the bark. Occasionally the birds by a nervous motion of the head caught an insect. There was no doubt as to when they did this, either on

the bark or in the air, for in swallowing an insect they always occupied an appreciable time in the process.

During the forenoon I nailed to the tree near the drills three tiny cups of birch bark. These I filled with maple syrup. The birds, although not disturbed by these cups, did not then drink from them. In the course of the morning I shot a crow and two blue jays from where I sat, but the sapsuckers, although greatly startled by the reports, returned quickly after their first fright.

The day following, July 23, I was on duty at the tree from 9 A. M. until 6.30 P. M. I lay on the ground concealed by the spreading branches of a beech tree; my watch hung from a twig before my eyes, while, equipped with pencil and paper, I took notes of all that occurred from minute to minute throughout the day. My record runs as follows: —

Wednesday, July 23, 9 A. M. Arrive, climb tree, fill cups, male sapsucker comes, scolds, goes off. No insects in the sap.

9.08. Male returns, dips from six holes.

9.09. Goes out on dead limb.

9.11. Hummer takes sap from two holes. I could hear no humming. Male quiet.

9.15. Young woodpecker comes.

9.17. Goes out on limb, having dipped 37 times in 9 holes. Male flies.

9.20. Young dips 39 times from 13 holes.
9.22. Goes out on limb.
9.26. Male comes, dips 15 times from 9 holes.
9.27. Male drills a new hole. Hummer comes and goes ; gets nothing.
9.28. Young flies north.
9.30. Male catches insect on the wing, goes on limb. Catches another insect on wing.
9.32. Hear a hummer. Male drums.
9.34. Male dips from four hole. Flies west.
9.44. Male returns, dips 9 times, 7 holes, goes on limb — drums, preens.
9.47. Hear drumming.
9.50. Female comes from north, they chatter. Male flies north.
9.51. Female dips, goes on further side of tree and drills.
9.52. Comes to cups, tastes syrup in one.
9.53. Flies away, east.
10.01. Male comes from north, dips 17 times, 12 holes.
10.03. Flies north. Hear a hummer.
10.09. Female comes from east, dips in drills and then from cup No. 1, 4 times.
10.10. Flies east.
10.37. Female comes.
10.38. Male comes. Female dips 4 times in cup No. 1 and goes east.
10.39. Male dips in 5 holes, taps on bark, preens.
10.42. Goes out on limb, scratches and preens. Seems to have lice.
10.45. Young comes.
10.47. Male goes to another tree, undrilled, and begins drilling. Young dips in 40 drills.
10.48. Hummer comes. Young drives it off.
10.50. Young stands on cups and dips in a few holes many times.

10.53. Still dipping from same holes.
10.57. Still dipping at intervals.
10.58. Male comes, nervous, drills.
10.59. Young tries to drill, four feet above drills.
11.02. Male and young both drilling.
11.06. Male dips, goes out on limb.
11.10. Young dips.
11.15. Male dips, goes back on limb, flies east.
11.16. Young dips from cup No. 3 and from new holes.
11.17. Young digging in old holes.
11.19. Young dips from holes and dips twice in cup No. 3.
11.20. Goes on limb.
11.22. Dips from holes just made by male.
11.25–11.30. Still dipping at intervals.
11.32. Male comes from east. Young goes.
11.33. Male drills.
11.35. Looks at cup. Goes out on limb.
11.37. Catches insect on wing, brings it to the tree, crowds it into hole, and eats it piecemeal.
11.38. Female comes. Goes direct to cup No. 1 and dips 4 times.
11.40. Female dips in new hole and drills one.
11.47. New hole done, after 6½ minutes hard chiseling.
11.49. She catches insect on the wing, puts it in a hole and eats it.
11.50. Hear a hummer.
11.52. Female drills.
11.55. Dips, goes on limb, wipes beak and preens.
12 noon. Female completes toilet, dips and flies away.
12.05–12.10. I examine tree. What appeared to be drilling new holes was mainly clearing dry wood from existing drills and running several drills into one large one. The drills are always lower at the back next the wood than at the front, thus forming cups for the sap to collect in. The holes

begun by the young did not reach the cambium layer. I find no insects in sap or syrup.

12.23. Female comes from north, dips, pecks and preens.

12.27. On limb preening.

12.30. Still there. I go home for dinner.

2.30. Return. Young in tree. I climb, he flies. I place a flame-colored nasturtium above cup No. 1.

2.37. Female comes, dips in new holes.

2.38. Sees nasturtium — petrified by astonishment.

2.39. Hitches towards flower, and touches it three times, with her bill. Satisfied, dips.

2.40. Drills and later does nothing.

2.48. Catches an insect on the bark by a quick pecking motion. Goes on limb.

2.51. Young comes, dips. No notice of nasturtium.

2.53. Young goes on limb. Female comes in and drills.

2.54. Young comes in and walks over nasturtium.

2.55. Female drinks from both cups, bill glistens.

2.57. Both fly. Young seems color blind.

2.58. Male comes, dips, goes near flower, does not notice it at all.

3.00. Male preens, clinging to bark.

3.01. Female returns. Male dips. Both preen.

3.09. Male dips.

3.13. Male hops to nasturtium and touches it with bill three times. Looks at cup but dips in holes.

3.15. Nasturtium blows away.

3.19. Male dips. Female drinks 17 times from cup No. 1 and once from a drill.

3.22. Male sleepy, dips now and then. I peep, mew, whistle, hoot, bark and talk, but no sound makes the birds do more than move their heads.

3.28. Hummer comes ; sees male and retreats.

3.29. Male dips.

3.30. Female flies east.

3.33. Male dips and goes on limb.
3.37. Male hangs wings and opens beak. Sits in sun.
3.42. Preens, comes in and dips, goes back.
3.47. Young comes, dips 30 times. Male goes on limb.
3.52. Hummers near, male comes in, very lively, dips.
3.56. Male drills. Young stays close to him.
3.58. Young goes on limb and hangs his wings down each side, so they show underneath the limb.
3.59. Male goes on limb.
4.00. Male comes in and tries to catch passing flies.
4.02. Young wakes and preens.
4.04. Male begins new hole.
4.05. Male goes on limb. Young dips.
4.07. Young drinks 4 times from cup No. 3.
4.08. Male dips. Young goes on limb.
4.10. Male goes out.
4.13. Male comes in, and dips.
4.17. Young flies in, male goes out. Young dips 48 times from drills.
4.25. Both quiet.
4.27. Male comes in. Young dips.
4.30. Male drills new hole higher up.
4.35. Young flies east.
4.40. Young comes from east, dips, male dips.
4.50. Male and young dipping.
4.55. I squeak, hummer flies in and alights.
4.59. Female has been gone 90 minutes.
5.00. Male motionless. Young in next tree.
5.06. Male dips, and flies away on seeing me.
5.07. Young comes in and dips 16 times from cup No. 3.
5.13. After dipping in holes goes to cup and dips 5 times.
5.14. Female comes from south, young flies south.
5.15. Female touches cup 3, then goes to cup 1 and dips 13 times.

5.16. Goes out on limb.
5.20. She drills, and continues to drill a long time.
5.35. Hummer comes, alights, flies away.
5.36. Young comes and dips. Female goes.
5.38. Young dips 7 times in cup No. 3, then in several new holes.
5.41. Male comes.
5.44. Young dips in cup No. 3, 7 times, flies off.
5.46. Male rattles around over cups and bark, but thus far I have not seen him drink from cups.
5.49. Young returns, dips 3 times from cup 3. He always wipes his bill in a drill after drinking syrup.
5.55. Young dips again in cup 3 and flies south.
5.56. Male flies in and clings close to cup.
6.00. Hummer near.
6.02. Male dipping and preening.
6.08. Young comes from south.
6.12. Male and young dipping.
6.18. A hermit thrush alights on the limb from which the woodpeckers always take flight. Young flies at him twice and drives him away and out of the tree.
6.30. Young still dipping; I go home.

On July 24 instead of going to Orchard No. 1, as I shall call that already described, I went first to another half a mile northeast of it, where, in August, 1889, I had seen sapsuckers drilling a canoe birch, and humming-birds and a downy woodpecker apparently sharing in the profits of the tree.

I reached Orchard No. 2 at 6.45 A. M. The tree in use last year was nearly dead. Two

neighboring birches showing scars of earlier years were quite dead. All stood on the crest of a kame. About three rods along the ridge to the eastward, a red oak and two or three canoe birches were in use by the birds. Five sapsuckers, including a male, female and three young, were frolicking and dipping. The male was somewhat rough with the young birds. I stayed until 7.30. Humming-birds made thirteen visits in that time and were generally allowed to dip freely. A black-and-white creeping warbler was driven from the tree. A red-eyed vireo was not disturbed in the higher foliage. Three separate times while one humming-bird was dipping another came. The effect was astonishing. Volleys of squeaks proceeded from both birds. They dropped directly downwards from the tree about twenty feet, and when close to the tops of bushes and brakes began to go backwards and forwards like a long pendulum, the trunk of the tree coming opposite the lowest point of their course, and the arc made by them measuring about forty feet. Their humming and squeaking were continuous. At the end of the performance only one bird was to be seen, and he quietly perched in the tree. I think this oscillating flight was made five or six times in each of the three performances which I witnessed.

The following evening, July 25, I visited Orchard No. 2 again. One sapsucker and two humming-birds were at work dipping between 7.20 and 8 P. M. The pendulum act was not performed. The hummers were not disturbed by the woodpeckers. They continued to dip until it was too dark for me to see them, although I could hear their wings.

On the preceding morning, after my visit to Orchard No. 2, I spent a short time at Orchard No. 1. I found the birch bark cups empty. I filled them, and as I reached the ground the young woodpecker came and began dipping from cup No. 3. He dipped ten times, then poked into two drills and flew away. The female came immediately after, dipped in a few drills, saw the fresh syrup, dipped ten times in cup No. 1, and flew away. That day and the 26th were rainy. On the 27th at 6.15 A. M. I saw a male hummer working on evening primrose blossoms. He ignored other flowers. I reached Orchard No. 1 at 6.35. The young one was there. I filled cup No. 1, the others being torn or warped. A hummer flew almost into my face while I was in the tree. About twenty new drills had been made since the 23d, all being higher up the trunk than previous ones. About two inches in height had been gained. I remained on the watch nearly nine hours, going away only for meals and a brief visit

to Orchard No. 2. During the nine hours the male paid ten visits to the tree, the female four and the young one three. Forty-one visits were made by humming-birds; in several instances two were in the tree at once. The tree swarmed with insects, mainly large flies. One or more butterflies came. Early in the morning, I added brandy and sugar to the maple syrup in the cup. The humming-birds with one exception dipped only in the drills. In one case a humming-bird drank for sixty seconds (including a rest of ten seconds) from the cup. He then flew away. The young sapsucker dipped only from the drills, the female dipped thirty times or more from the drills, and twenty-five times from the cup. The male dipped fifty-four times from the drills and worked a little in deepening holes, drank sixty-six times from the cup and caught twenty insects, some on the wing, some on the edge of the cup.

I noticed with surprise that the humming-birds in more than one instance took sap while clinging to the bark with their feet, their wings being at rest. I have been told by a careful observer that they cling to the trumpet flower in the same way while crowding themselves into its mouth to draw its sweets.

My notes refer again and again to the spiteful treatment of the hummers at Orchard No. 1. On the other hand, at Orchard No. 2 they say,

"Male and young one dipping. Hummer comes in and dips several times *between them* and they offer no objection."

In spite of the fact that one young bird had been shot from the family at Orchard No. 1, the tree was without woodpeckers only about one hour out of the nine that I watched it on July 27.

On the 28th, I arrived at Orchard No. 1 at 7.28 A. M. and watched it for two hours. On my arrival I filled one cup with brandy, sugar and syrup, and another, a new one, with pure brandy, and a drop or two of the mixture on top. A humming-bird's arrival at 7.30 brought the male sapsucker from a neighboring tree. The hummer was driven away. The woodpecker dipped several times and then tried the pure brandy. He shook his beak and hitched away from the cup. Then he went out on the limb used as a regular point of departure and flew north, as my notes say, "pointing and flying as though for a long trip." At 8.13, a male hummer drank forty seconds from the cup containing the brandy and syrup mixture. At 8.16, a female hummer drank twenty seconds at the same cup. Both ignored the drills. At 8.42, a female hummer while drinking was attacked again and again by the wasps and bees surrounding the tree, and compelled to defend herself. At 9.05, the female woodpecker arrived, dipped in a few holes and

then went to the brandy cup. She drank six times, then went out on the limb and presently began shaking her head violently, showering drops from her beak in every direction until she had thrown up what I estimated to be two teaspoonfuls of liquid. She flew away eastward, but soon returned and remained until 9.30, when she flew north "as for a long trip."

I then hurried to Orchard No. 2 and remained there from 10.07 until 11.15. On some of the trees at this orchard a thick growth of small sucker branches was conspicuous just below the drills. I think it was caused by them. It served as a screen for the sapsuckers. During this hour three woodpeckers were at work dipping, and occasionally catching some of the numerous insects of which the air was full. Seven visits were paid by humming-birds. One of the trees in use by the woodpeckers, hummers and insects was a red oak. The drills in it were very small and round. At 11.15, I went into a large swamp to the east of Orchards 1 and 2 in search of fresh evidence. After walking a quarter of a mile, I paused and hooted like a barred owl. A young sapsucker promptly appeared, and a moment later a humming-bird, which alighted close to the woodpecker. Seeing no owl, the humming-bird flew off towards the point from which the sapsucker had come. I followed and

found Orchard No. 3, consisting mainly of trees girdled long ago and now dead. The tree in use was a red maple. Its drills were about twenty-five feet from the ground. One bird was dipping; two more came soon after. After a brief stay I went home to dinner. Returning at 2.45, I stayed until 4.15. A downy woodpecker passed without going to the drills. At 3.35, I killed two young woodpeckers with a single charge of dust shot. A few moments later a humming-bird alighted in one of the dead maples. At 4.10, I was drawn away by the hooting of a barred owl, and did not return to Orchard No. 3 until August 7, when I found only one sapsucker at work, a young one, which I shot. I do not think that I found the principal trees in this orchard.

I ended my observations of July 28 by a visit of twenty-five minutes at Orchard No. 4, which I had first seen three years before. It consisted of a large number of dead and a few living trees, which stood on a delta formed by the Chocorua River at its point of union with Chocorua Lake. The part of the orchard in use was a birch, from whose root rose four major trunks quickly subdividing into fifteen minor stems each rising to a height of over thirty feet. All of these fifteen trunks were dead or dying. Only seven of them bore leaves. I reached this orchard at 6.25 P.M.,

and finding no birds in sight placed Puffy on a stump close to the drills, which were only seven to nine feet from the ground. Instantly a humming-bird appeared, buzzing and squeaking, and the next moment a female sapsucker came into the tree scolding. I removed Puffy and soon after the humming-bird began dipping, giving a squeak each time he dipped. At 6.50, the hummer, again discovering Puffy, flew within ten inches of his eyes, buzzed indignantly and flew away.

On August 5 from 3 to 4 P.M., no sapsuckers came to Orchard No. 4 and only one hummer. A high wind was blowing.

On August 7, I visited Orchard No. 1. About twenty new holes had been made since July 28, and great quantities of frothy sap were wasting. The sap was as sweet as though artificially sweetened. I saw one young sapsucker and one humming-bird; neither of them dipped. The woodpecker caught several insects.

On August 8, I reached Orchard No. 4 at 6 A.M. At 6.03 a hummer came. At 6.06 a young sapsucker came and began dipping. I had with me, instead of one of my barred owls, one of three young screech owls which had been confided to my care for the season. "Scops" was placed in a conspicuous position in the heart of the orchard. The sapsucker had scarcely be-

gun dipping when he saw the owl and raised the alarm. Over thirty birds came, including two hummers. By 6.30 the noise subsided, and the sapsucker, who had not left the tree at all, resumed his dipping. A male hummer was also dipping at 6.31. At 6.42, the sapsucker was dipping within seven feet of my head, and the hummer was perched close by. At 6.47, the hummer buzzed in Scops' face and then perched again. At 6.52, another hummer came and both flew away; at 6.54 both came back, but went again. At 6.56 Scops, whose wing was clipped, jumped nearly six feet at the young sapsucker, at whom he had been glaring for some time. The woodpecker flew with a loud cry, scolded for a long time and then disappeared. I nailed a birch bark cup to one of the stems, and while doing it a hummer came and looked at me. Later he came again, looked at the cup and dipped at drills close above it.

I spent from 10 A.M. until 12.34 at Orchard No. 2, for the purpose of shooting all sapsuckers seen there. I found last year's tree again in use, and those in use July 24 and 25 temporarily abandoned. From 10 to 10.48, the sapsuckers seen, spent all their time catching insects on the wing, sometimes flying fifty feet for them. Humming-birds were numerous, and, as I had noticed was the case with this orchard, were unmolested even when dipping within a foot of a

sapsucker. At 11.15, I fired while a hummer and young sapsucker were both dipping, and killed the woodpecker. At 11.47, I tried again and killed a sapsucker and male hummer with the same charge. At 12.12, a female hummer came and dipped for forty seconds. At 12.27, I shot another young sapsucker, and at 12.34 a fourth. As I left the orchard, a female hummer was dipping.

On August 10, I spent from 5.30 P. M. until 6.30 at Orchard No. 4. A young sapsucker and hummer were in the drilled tree during the entire hour. Although I climbed into the tree to put maple syrup in the cup, the woodpecker did not leave the branches. Neither bird took any syrup.

On August 13, I reached Orchard No. 2 at 6.40 A. M. At 7.09, a hummer buzzed in my face so near that I was startled and waved her off. At 7.15, a hummer was dipping in a canoe birch near by. At 7.17, I fired at her but missed. She dipped again at 7.29. At 7.32, I fired again and failed. At 7.37, she was dipping again and then perched near by. She dipped again at 7.45 and 7.49, and I tried a third shot which was successful. At 7.58, a female hummer was dipping in the same spot. At 8.07, I left without having seen a woodpecker but with the certainty that more than a single pair of hummers used Orchard No. 2.

On August 14 at 3 P. M., humming-birds were using Orchard No. 2, but the supply of sap was diminishing and no woodpeckers were to be seen. I shot away a small limb which I noticed the humming-birds perched upon, and a few moments later one returned and flew in zigzag lines near the spot, searching for the missing twig. The same or another bird repeated the search a few minutes later. At 4 P. M., I reached Orchard No. 1, which seemed deserted, nothing coming during an hour and a half. Great streams of frothy sap extended down the bark to the ground and formed a moist spot on the leaves and mould. The trees smelled sour and the lower sap tasted sour. I climbed to the drills. The upper holes were blowing bubbles of sap, and a slow current was flowing from them, readily visible to the eye. Many kinds of insects were upon the trunk, including ants, common house-flies, and hornets. One of the last named stung me without other provocation than my presence, and I descended rapidly from the tree. By a mark made on July 23, I was able to determine that in three weeks the drills in this red maple had been carried eight inches up its trunk.

On September 5, I paid a final visit for the season to Orchard No. 1. There were no birds present between 2.30 and 3 P. M. But little sap

was flowing. The tree looked in better condition than in July or August. Great numbers of hornets were in control of the tree. A few butterflies hovered near, but were driven away by the quarrelsome hornets.

On May 1, 1891, I took advantage of a brief trip to Chocorua to visit Orchard No. 1. The sapsuckers were there and had evidently been at work several days. The red maple, their principal tree, was covered with flowers above the belt of drills, and with newly opened leaves on its lower limbs. The female was dipping at a series of new drills which had been opened two feet above the old belt. Forty-three holes had been cut on the trunk and nearly as many more on several adjoining limbs. Sap was flowing from the upper holes only, and not in abundance. It was slightly sweet. The male came to the tree once during my stay of half an hour, but he spent most of his time on a poplar a few rods distant, where he was digging his family mansion. The poplar was a vigorous tree, about forty feet in height. The hole was on the southeast side of the trunk a little more than twenty feet from the ground. It seemed to be already four or five inches deep. The birds were noisy, especially so when the female went to inspect the male's digging, and when the male came for a moment to the drills. Only two sapsuckers ap-

peared, and no humming-birds were to be seen. There were practically no insects to be found near the drills.

During July and August, 1890, I shot in all eight sapsuckers at the various orchards. I preserved their stomachs, which were well filled with insects. Some of these stomachs were examined by Professor Hagen, who wrote to me on August 21st as follows: —

"The woodpecker has hashed his food so fine, that it is beyond my power or knowledge to determine accurately the composition of this bug-hash."

Mr. Samuel H. Scudder was able to speak with more confidence of the stomachs which I sent to him. Under date of December 19, he said: "The insects in the different stomachs are in all cases almost exclusively composed of the harder chitinous parts of ants. In a cursory examination I find little else, though one or two beetles are represented and No. 4 must have swallowed an entire wasp of the largest size, his head and wings attesting thereto. If the birds were very different in habit, or presumably in food, a comparison of the kinds of ants might lead to the detection of some peculiarities. A number of species are represented."

It is worthy of note that the structure of the tongue of this species is somewhat unlike that of

the tongues of other woodpeckers. In form it is not adapted to use as a dart for securing insects, and its fringed edges have suggested to biologists who were not observers of the bird's habits that sap might, as in the cases of species with similar apparatus, form an important portion of its food. The following extract from a letter written to me by Mr. W. F. Ganong, Instructor in Botany at Harvard University, gives a clear history of the progress of sap in its ascent and descent.

"It is now thought by botanists that the elaborated sap from the leaves is transferred down the stem through the soft bast cells of the inner bark, just outside of the cambium layer. It hence passes to the medullary rays, where it is stored up to last over the winter in the form of starch chiefly. Some of it is stored also in the wood cells of the young wood — but none I believe in the ducts or fibres or main masses of the wood itself. In the latter there is a current of crude sap from the roots flowing up, but I do not think any botanist thinks that the elaborated sap flows down by the same path. Hence if the woodpecker in July or August penetrates the *wood*, he would get only crude sap from the ordinary wood tissue, but he might get elaborated sap from the medullary rays or some of the smaller wood cells — much more of the former

(*i. e.* unelaborated) than of the latter (*i. e.* elaborated), I should say. If he penetrates to the cambium only he would get elaborated sap (which is being transformed into tissue), and if he penetrated the soft inner bark only he certainly would get elaborated sap flowing downward, and probably that only. If it is elaborated sap he wants, he would do much better to go no further than the inner bark and cambium. The medullary rays are so small in proportion to the size of a woodpecker's bill and tongue that he would receive but poor wages for his labor in penetrating them. Of course in spring before the leaves are fully out, the sap is very rich as it flows up, both in starchy and albuminoid matters, and *then* it would be worth working for. But as late as July and August, the upward flowing sap, while it contains traces of these nutritious substances, must be very poor in them.

"I never thought of the question before, because I did not know that woodpeckers bored for sap. I always supposed it was insects and their larvæ they were after."

SUMMARY.

From these observations I draw the following conclusions: that the yellow-breasted woodpecker is in the habit for successive years of drilling the canoe birch, red maple, red oak,

white ash and probably other trees for the purpose of taking from them the elaborated sap and in some cases parts of the cambium layer; that the birds consume the sap in large quantities for its own sake and not for insect matter which such sap may chance occasionally to contain; that the sap attracts many insects of various species, a few of which form a considerable part of the food of this bird, but whose capture does not occupy its time to anything like the extent to which sap drinking occupies it; that different families of these woodpeckers occupy different "orchards," such families consisting of a male, female, and from one to four or five young birds; that the "orchards" consist of several trees usually only a few rods apart, and that these trees are regularly and constantly visited from sunrise until long after sunset, not only by the woodpeckers themselves, but by numerous parasitical humming-birds, which are sometimes unmolested, but probably quite as often repelled; that the forest trees attacked by them generally die, possibly in the second or third year of use; that the total damage done by them is too insignificant to justify their persecution in well-wooded regions.

YOUNG SAPSUCKERS IN CAPTIVITY.

I SPENT much time during the summer of 1890 in watching yellow-breasted woodpeckers at work in their "orchards" near Mt. Chocorua, N. H. From my observations I drew the following conclusions, that "the yellow-breasted woodpecker is in the habit . . . of drilling . . . trees for the purpose of taking from them the elaborated sap, and in some cases part of the cambium layer; that the birds consume the sap in large quantities for its own sake and not for insect matter which such sap may chance occasionally to contain; that the sap attracts many insects of various species, a few of which form a considerable part of the food of this bird."

These conclusions differed so radically from opinions held by many ornithologists that some persons, who either doubted the sufficiency and unimaginativeness of my observations, or who read my conclusions without scrutinizing my statements of fact, were unwilling to admit that I had proved the yellow-breasted woodpecker to be a sap-drinker. In order to present additional and different evidence in the case, I determined

to secure several living sapsuckers, to cut them off as completely as might be practicable from insect food, to feed them if possible upon concentrated maple sap, and to see whether a diet of that kind would sustain life. It was possible that they might refuse to eat anything, that they might eat the offered food but die in a few days, that they might live for a time but show distress and inability to digest the food. On the other hand it was possible that they might take kindly to the diet, thrive upon maple syrup, and live for weeks, perhaps months, in a manifestly healthy condition. I had confidence enough in my previous observations to believe that the birds would relish syrup, and would live upon it for a sufficiently long time to induce those who still considered the birds insect eaters only, to admit that a contrary presumption had been raised.

It was first necessary to secure the birds. Having failed, in 1890, to catch old birds by making them tipsy, I decided to secure a nestful of young birds before they took to the wing. Searching the forest near Orchard No. 1, I found, on July 1, a nest filled with noisy fledglings whose squealing sounded afar in the otherwise silent woods. The hole was on the south side of a living poplar, about twenty feet from the ground. Two old holes scarred the trunk. The parent birds came frequently to the tree, and their arrival was always

greeted by more vigorous crying from the young. On the 6th, I visited the nest again and found both old birds feeding the young, which were now much nearer the mouth of the hole. The old birds scolded me on my approach, and the young remained silent for a long time after hearing the warning notes of their parents.

On Tuesday, July 7, at noon, I raided the nest. The poplar was felled so that its top caught in a tree near by, preventing any shock to the young birds. In spite of the resounding blows of the axe, the old birds continued to come to the nest, and in the intervals of chopping they fed the young. Moisture glistened on their bills, and I was not sure that they brought insects in any instance. One young bird flew before the tree fell, a second took wing as the crash came, but the third remained in the nest until taken out by hand. I named them Number One, Number Two and Number Three, corresponding to the order of their entry into active life. Their coloring varied sufficiently for me to recognize each with certainty after his transfer to a cage, and as weeks passed by they became more and more dissimilar both in coloring and conduct.

Their cage was an oblong pine box containing about three cubic feet. Its floor was covered with sawdust, its face was closed by fine wire mosquito netting, and apple and alder branches were ar-

ranged for perpendicular and horizontal perches. A sliding door allowed me to handle the birds when necessary. During the afternoon of the day of their capture I fed each bird four times with sugar and water. Holding each little creature in my left hand I slid the tip of a small quill toothpick between its mandibles, when it quickly drank the few drops of liquid held in the half-filled quill. The second time I did this the bird opened its beak willingly. By the fourth lesson the rapid use of the long and nervous tongue in draining the quill of every particle of moisture showed that the quill was a satisfactory substitute for the parent's bill.

At 5 A.M. on July 8, the young sapsuckers began a lively "rat-tat, tat-ta-ta, tat-tat" on the resounding sides of their box. They were unmistakably hungry when, an hour or two later, I presented the point of the quill at a hole in the wire netting. One bird after another drank the diluted maple syrup with which I filled the tube. I repeated this process at intervals of about half an hour until evening, the birds becoming more and more expert in draining the quill and more and more prompt in responding to my offers of nourishment. Number One was the most restless and aggressive; Number Three, the slowest in feeding, and the least hungry. It was also the dullest in coloring. On the 9th, the birds

did not begin to stir until about 7 o'clock, their cage having been darkened so as to prolong their slumber. On my presenting the quill all three tried to drink at once, and Number One was very rough with the others, striking them sharply with his beak. His violence led me to add a second room to the cage, into which the others could withdraw to escape him. I placed it directly above the other, with a round hole in the floor opposite a similar opening in the top of the first cage. None of the birds noticed the hole, either from below or from above, when put in the upper room. I placed cups of birch bark and wooden troughs filled with syrup in various parts of both cages, but the birds did not go to them. They took more syrup than on the 8th, drinking a greater number of times and more at each time. Towards evening, I exchanged the quill for a slender spout of birch bark through which I let the syrup ooze. They drank from the spout, from the netting down which drops coursed, and from the wood upon which the drops fell. Number One made his first attempt to catch a fly on the netting, but failed.

During more than half the day the birds were in motion, flying from one side of the cage to the other, hitching up and down the netting or the perpendicular perches, and pounding on the netting, boards and perches. Twice they gave the

squealing note of alarm so characteristic of the wild sapsucker. At night I looked to see how they slept. They were side by side, hanging erect upon the back wall of the cage, with their heads tucked under their wings. One by one they waked, and turned with sleepy surprise to look at the lamplight glaring at the mouth of their cage.

On July 10, I made serious efforts to teach the birds to feed themselves. Catching them at intervals, I dipped their bills into the syrup in their cups, forcing them to drink. By 9.30 A. M. Number One had learned his lesson. Two hours later Number Two drank voluntarily, and a little after one o'clock the feeble and timid Number Three followed suit. Early in the afternoon, Three seemed so exhausted by the blows showered upon her by One and Two, that I thought she was going to die. I took her out and allowed her to perch upon the top of the cage. Suddenly she revived, slipped through my hand, flew the length of the open barn, out into the trees beyond, and was gone. After searching for her for over an hour, I gave her up as lost.

At 8 A. M. the next day I heard a sapsucker squeal near the house, and running out found Three sitting on top of a clothes-line post. She looked bright and knowing, but did not offer to fly, even when I extended my hand to catch her.

Clasping her quickly, I carried her back to the cage. She was very hungry, and went at once to a cup and drank long and often. Her brief outing had given her courage to stand up against the attacks of the others, and I had no further anxiety for her health. I filled their cups at 8 A. M., 1 P. M., 4 P. M., and at dark, — the last as a precaution against unseasonable tapping in the morning.

During the next few days I filled the cups several times a day, and the birds drank freely, and seemed happy and perfectly healthy. On July 17, being satisfied that the birds never would learn to go up and down between the upper and lower cages, I removed the upper cage and placed it on the floor beside the lower one, opening a door between the two so that the birds could hop through from one to the other on the same level. They did this at once. I then added a third room which could be entered by a door in its side, and found that the birds quickly availed themselves of the chance to be alone for a part of each day.

One warm day I sprinkled the birds with water. They were greatly astonished, but at once surprised me as much as I had them, for they flung themselves upon the floor and went through all the head, wing, and feather motions of a bath, scattering about chips and sawdust in

a most energetic way. It was their first acquaintance with water. I at once supplied them with a large dish of water, in which they bathed occasionally during the summer, — usually, it seemed to me, towards evening, and when no one was near.

The smell of maple syrup which pervaded their cage of course attracted insects, which crawled up and down the outside of the wire netting, occasionally finding a crack in the cage and entering. The young birds were always on the alert to catch one of these intruders, and made a great fuss eating it, — squealing, and crowding into a corner to hold it securely between their breasts and the boards, until they could swallow it in just the right way. The number of insects caught by them in this way was small, and I do not think amounted at any time to ten per cent of their food.

Within a week after the birds' capture, I felt sure that Number Two was a male, because red feathers appeared on his throat. I surmised that Number Three was a female, partly on account of her more subdued coloring and partly from her gentleness. Number One bullied both Two and Three and was more noisy than they. By July 20, I had reduced the number of their syrup cups to one — a large earthen saucer which I filled once a day, sometimes twice. If

I allowed the saucer to become dry, the woodpeckers drummed more and more vigorously until I supplied their needs. Sometimes all three birds would drink at once. They were astir by 5.30 A. M., and still noisy at 8 P. M. On July 20, my notes say, "They are perfectly healthy and happy."

About noon on July 23, the door of the woodpeckers' cage was opened by mistake, and not long after, I discovered that Three had escaped for a second time. I searched for her in vain. The next day rain fell in torrents all the forenoon. About one o'clock, the cry of a sapsucker was heard through the closed windows of the house, and Three was discovered clinging to the piazza railing just in front of my study window. She was wet and dismal. I tried to catch her with my hand, but she flew to the nearest tree trunk, where I secured her by throwing a piece of soft mosquito netting over her. The moment I placed her in the cage she fastened herself beside the cup and drank many times. After satisfying her hunger, she retired to the darkest corner of the cage to dry and doze. The other birds paid no attention to her.

On July 25, two downy woodpeckers were working in my orchard. Taking a trout rod and line, I made a small slip-noose at the end of the tip joint and poked it into the tree where one of

the woodpeckers was inspecting the bark. He watched the rod and seemed puzzled by it, but did not fly. Slowly lowering the noose I let it settle around his neck, and then by a slight jerk drew it tight. He flew in small circles round and round the tip of the rod, held by the noose, and slightly choked by it. A minute later, freed from the line, he was in the sapsucker's cage.

He was a young bird, like the sapsuckers, and I supposed that the latter would not notice that he was not one of their own family. I thought it possible that he might follow their example and drink syrup from the cups, for I had once seen a downy woodpecker dipping at one of the sapsucker's "orchards." Unhappily, however, the stranger was not welcomed kindly, and as I was called away for the day, he had no defender. The sapsuckers pursued him from one corner of their cage to another, striking him fierce blows on his head and over his eyes, until he fell to the floor exhausted. Reviving, he again attracted their notice and attack, but his second fall was his last.

About August 1, it seemed to me that the sapsuckers were unusually restless; they whined and scolded a great deal and went from room to room incessantly. I think that at this season the wild birds begin to frequent their "orchards" less regularly than in May, June, and July. The

captives tapped a great deal, and I gave them a variety of things to play upon, as, for example, a sweet-toned glass tumbler, thin sheets of zinc, and resonant pieces of wood arranged to give out various tones. They tested these things, but seemed to prefer the sides of their cage, especially portions walled with clapboards, which yielded a great volume of sound to their blows. I spent many hours in noting down the number and order of their taps, in order to see whether they constituted distinct signals. At first it seemed to me that Number One liked to tap in twos and fours, that Number Three was more apt to make threes, or threes and fives, than other combinations, and that Number Two mingled fives and twos. The longer I listened, the more combinations I found them making, and at last I decided that with these birds it was mere chance whether they said -- ---- or --- --- or ----- --. They seemed to pay no attention to each other's performances, and to mean nothing by their own tappings. If they tapped at all, it was necessary to make some number of taps and to space those taps in some particular way. If in a large number of such series, ones, twos, threes, fours and fives came equally freely and frequently — as they seemed to — there appeared to be no ground for imagining that the different combinations indicated different feel-

ings or impulses. Nevertheless, I think the old birds at Orchard No. 1 during July, 1890, called each other by tapping, and I do not feel at all sure that closer study than mine might not work out a sapsucker code.

On August 9, I noted that the birds were "as noisy as a boiler factory," and that One and Three were showing reddish coloring on their heads. Three, I speak of as "gentle and refined," but One is constantly alluded to as rough, noisy, and restless. I tested their color sense by placing some flaming nasturtiums in the front of their cage. They did not even look at them, but trampled back and forth over them until the flowers fell.

On August 13, a very warm day, I saw one of the sapsuckers bathing at 7.30 P. M., when it was nearly dark in the cage. On the 14th — a rainy day — one of them bathed about 6 P. M. When the sun fell upon their cage in an afternoon, the birds often sought the sunlight, and, standing in it, drooped their wings and opened their mouths as though suffering. They could readily have avoided its heat.

On August 17, I was away all day, and the sapsuckers' syrup dish became dry. Early on the 18th, the birds began pounding so furiously, that, as my notes say, "they could be heard a quarter of a mile away." When I filled their

dish they crowded around it, and all three drank at once. They consumed more than a tablespoonful of the diluted syrup between 7 and 11 A. M. Ordinarily they disposed of eight teaspoonfuls each during the twenty-four hours. Part of this evaporated, and part was probably secured by black ants which visited the cage by night. On August 25, I did not give the young woodpeckers any syrup until late in the day. Then I offered syrup and insects at the same time. They ignored the insects and drank long and often of the liquid. Later they ate the insects. I kept a dish of water in their cage all the time, but they were seldom seen to drink from it.

On September 4, I placed the woodpeckers' cage in a finished room in the barn and opened their door to see what they would do with limited liberty. Number Three showed the effects of former freedom by coming first to the doorway and perching in it. After a moment, One flew out past her and bumped against the window pane. Ten minutes elapsed before Two came out. Then they flew back and forth from window to looking-glass, curtains to woodwork. I handled them freely, and they seemed to have no feeling of fear. They clung to my fingers, and perched upon my shoulders. All the interior finish interested them, and they hammered wood and glass, paint and plaster with vehe-

mence. One of them hopped back and forth over the board floor, striking it now and then as if it had been a great log, prostrate. Three caught a few of the many flies in the room, but showed no eagerness over them. The others scarcely tried to catch them. That night they slept in separate corners. In the night I lit a candle and looked at them. They awoke, squealed, and Three came to the syrup and dipped twelve times. The red on her head seemed brighter day by day. I also noted that Two was growing more yellow below. On September 6, I noticed that One and Three were together while Two remained much alone. He seemed to be moulting. During the next fortnight I let the birds out once or twice each day and watched them closely. Three was the only one which seemed to care much about catching house flies, and she secured very few. Black ants visited the cage at night, and occasionally I heard the birds moving about a great deal, although their cage was as dark as it could well be made. By September 11, Three had transferred her affections from One to Two. The latter's plumage had by that time become quite brilliant; the yellow and black below, and the red on head and throat, making him a decidedly distinguished looking bird. He made up for all Number One's earlier bullying and browbeating by scolding

him and driving him from perch to perch. When free in the room, Two and Three spent most of their time upon a great horizontal timber, a portion of the framework of the barn, which ran through the upper part of the room. It had been rough-hewn by the sturdy hands which had framed the barn many a long year before, and patches of bark still clung to its surface. The devoted couple ran up and down the upper surface of this beam, tapping from time to time upon its flat face, never upon its edges. One stayed in the cage much of the time when Two and Three were together. He seemed jealous and far from cheerful. None of them ever went back to the cage voluntarily, and as time passed they did their best to avoid me when I was ready to lock them up.

On the evening of September 12, the birds were very restless. Between eight and nine they were drumming furiously. The night was dark, and not a ray of light found its way into their cage. On September 16, they continued their hammering until 10 P. M. They took less syrup than usual at this time and caught practically no insects. On September 21, my notes speak again of the small quantity of syrup consumed by the birds. On September 26, the birds were brought to Cambridge in a small box. They were fed in the usual way, and drank fre-

quently from their dish while the train was at rest. The next day they were given a room to themselves. It was eight feet by five and was lighted by a window looking into an upper entry. Opposite and above the window was a large skylight through which sunlight streamed into their room for several hours each day. They promptly chose the curtain roller at the top of the window as their favorite perch, and to this I attached their syrup dish, which they recognized and used at once.

For several days they seemed perfectly well and contented. They hammered the woodwork, cut holes in the plastering until they reached the laths, and drilled small holes in the floor. Absolutely no insects gained access to their room. On October 4, I state in my notes that they never seemed more happy or more energetic. They bathed freely at this time while I was in their room, and seemed to enjoy the water greatly.

On October 11, I recorded the fact that Three seemed dull and allowed me to catch her without opposition. On the 12th, she was evidently feeling far from well and stayed on the floor, but Two and One were unusually cheerful. On the 13th Three showed alarming symptoms. As early as 7 A.M. she had a convulsion, throwing herself upon her back and struggling violently.

Reviving, she drank some syrup and seemed better, but the spasms recurred at frequent intervals during the day. She kept her head moving up and down a great deal of the time. When a spasm was imminent, she turned her head far around to the left, and, with her neck thus twisted, spun around towards the left seven or eight times, then fell upon the floor and beat her head upon it. After most of these spasms she drank from her cup, and during the day she ate four flies which I gave her. The last attack was at 5.30 P. M., and not long after she was found dead. I placed her body in the hands of several graduate students in biology at the Museum of Comparative Zoölogy, and received from one of them, Dr. Thomas G. Lee, the following statement: "We found the intestines quite empty. In the stomach, which was deeply bile-stained, was a ball composed of cotton fibres and containing fragments of insects. The liver was very large, deeply bile-stained, and very soft. The other organs were apparently normal." The body was plump, and large deposits of fat covered the abdomen.

On Sunday, October 18, Number One, who had been dull for a day or two, showed symptoms similar to those of Number Three. He had several convulsions and was weak after them. I gave him lemon juice. For several days I had

been trying to change the diet of the surviving birds, but they refused everything except their syrup and a fly or two which they seemed to care for but little. Among the things offered them were a sweet apple, a pear, a peach, grapes, and earthworms. I diluted their syrup more than usual, and put lemon juice with it. Number One's condition was such on the evening of the 18th that I had no hope of finding him alive on the next morning. He survived, however, although in a most pitiful condition; his eyes winked frequently, he seemed to see little, and that little in such a way as to confuse distances; his breathing was unnatural and he trembled constantly. Monday passed, and while One grew no better, Two became seriously ill. On Tuesday morning, both birds were alive, that was all. At eight o'clock, Two had a violent convulsion and never recovered from it. A few moments later One, who had clung to life with such tenacity, died in the same way — maintaining to the last the advantage which he had first claimed in the nest. Number One was examined by an expert physician in Cambridge, who pronounced his liver enormous and in a diseased condition. It nearly filled the abdominal cavity, crowding other organs. It was soft and greenish. Number Two was forwarded to the Department of Agriculture, which reported that the bird "had

enlargement and fatty degeneration" of the liver. The most probable cause of this enlargement of the liver, which seems to have been the reason for the death of the three sapsuckers, was an undue proportion of sugar in their diet. In a wild state they would have eaten insects every day and kept their stomachs well filled with the chitinous parts of acid insects. Under restraint they secured fewer and fewer insects, until, during the last few weeks of their lives, they had practically no solid food of any kind. Two of them lived in captivity exactly fifteen weeks, and the third fourteen weeks. During that time they subsisted mainly upon maple syrup diluted to half its strength with water. This diet was not refused nor disliked by them at the outset; quite the contrary, it was adopted readily. It did not cause speedy death, nor even indigestion. The birds did not mope and pine; they enjoyed life, changed their plumage as much as caged birds could be expected to do, and until nearly the time of their deaths manifested no abnormal condition. In fact, they throve upon maple syrup and were in an apparently healthy condition for more than three months.

SUMMARY.

From these experiments I draw the following conclusions: (1) that the yellow-breasted wood-

pecker may be successfully kept in captivity for a period corresponding to that during which as a resident bird he taps trees for their sap, sustained during this time upon a diet of which from 90 to 100 per cent is diluted maple syrup; (2) that this fact affords evidence of an extremely strong character, in confirmation and support of the theory that, when the yellow-breasted woodpecker taps trees for their sap, he uses the sap as his principal article of food, and not primarily as a bait to attract insects.

WAYS OF THE OWL.

Since June, 1888, I have had in my possession for longer or shorter periods eleven live owls, including snowy, great-horned, long-eared, barred, and screech owls. I have also had opportunities of watching Acadian and screech owls in a wild state. In June, 1888, I secured two young barred owls from a hollow beech-tree in a White Mountain forest. I have them still after three and a half years of happy companionship. During the first summer they were pets not easily petted. They used beak and claws fiercely and resented familiarity. I kept them in a large slatted cage in my barn, where they had plenty of air and light. They bathed freely and frequently. They ate largely of animal food. They were awake by day, restless at twilight, but profoundly quiet by night. They could see perfectly in bright sunlight, and better at night than most creatures. In the autumn I took them to Cambridge, where they were given a large cage in my cellar. During the winter I handled them more and more freely, beginning by using stout leather gloves, but soon stroking and rub-

bing their heads with my bare hands. They became more and more gentle, and I found that even when they nipped me with their beaks they did not attempt to cause serious pain. One of them, whose name is Puffy, injured his wing early in his captivity, and has never been able to fly. The other I keep clipped in one wing. In the spring of 1889 I began taking Puffy with me on walks. I found at once that he was wonderfully useful in attracting other birds. During the summer of 1889, the following winter, and the summers of 1890 and 1891 he was my companion on walks, drives, and trips in my Rushton boat. To a smaller extent I have taken his mate Fluffy with me, but he is of a less patient disposition than Puffy, and during a long walk is sure to hop from the stick upon which I carry him many more times than Puffy would in an equal period. In May, 1891, I secured a third baby barred owl from the same beech-tree. From the first hour that he was imprisoned he has shown an irritable temper. His whining as a young bird was incessant by day and not always suspended by night. Now, at the age of nine months, he whines whenever any one approaches him, and frequently makes violent assaults upon me when I enter the part of my cellar in which the owls are penned. Puffy and Fluffy during their first summer were quite

timid, and Fluffy is an arrant coward now; but Prince Edward, as the new captive has been named, has never shown fear of anything living or dead, large or small.

Of two fully grown screech owls which I owned, one in the spring of 1890, the other in the spring of 1891, little is to be said. They were unhappy, and, although they ate well, both died from the effects of pounding their heads against wire netting in efforts to escape. These owls, when approached, stiffen their ears, make their feathers lie closely against their bodies, keep every joint and muscle rigid, and so nearly close their eyes that only an expressionless slit remains through which they watch the intruder. To the gentle caress of a hand they pay no heed. I have often taken one of them in my hand, laid him upon his back, and so carried him from room to room, and not been able to detect the movement of a feather. Let, however, the intruder retire, or let him take a dead mouse from his pocket and draw it by a string across the floor, and Scops is himself again in a twinkling. The ears are lowered, the bright eyes open wide with a wicked glare, and the soft wings take the crafty and cruel little bird swiftly down upon the mouse. This habit of shamming unconsciousness appeared to be characteristic of the long-eared owl which was mine for a few brief hours

in October, 1891. I handled him freely, but the closed eyes and rigid muscles did not move. I went away and watched him from a distance, and he was alert and making full use of his beautiful eyes.

Early in the summer of 1890, a friend sent me three young screech owls. They were as odd little gray hobgoblins as could be imagined. Their temper, their voices, their appetites — all needed superlatives to describe them. They were sent to the White Mountains for the summer, and lived in a slatted box under the barred owls' big cage. They loved mice, birds, and fish, but did not take quite as kindly to raw liver as the barred owls did. For a week or more two of them were taken away from the third, and when they came back they no longer knew him as a brother. His life was made a burden to him, and one morning in August I found his body lying on the floor of their cage. They had removed nearly all his feathers and would probably have devoured him if I had not deprived them of the fruits of their unnatural crime. A few days passed and the two murderers quarreled over a mouse. In the frequent struggles that followed, one was killed outright and the other survived but twelve hours. My efforts to tame these young screech owls were only partially successful. The murdered one had

taken several excursions with me, and while I walked clung to a stick carried in my hand, or nestled between my arm and my body. If placed in a tree he served quite well as a decoy, although perhaps some species of birds did not take him as seriously as they did the barred owls when those intruded upon their breeding-grounds.

In June, 1891, I was presented with Snowdon, a full-grown snowy owl, which had been captured during the preceding winter. He was a dangerous-looking bird, with a temper and a trick of jumping for one's fingers. I clipped one wing and began by handling him roughly if he showed a disposition to fight. At the end of a week he learned to step upon a stick and cling to it while I carried him back and forth in the cellar. Taking him to the White Mountains, I gave up to his use a box stall in the northeast corner of my barn, and kept damp reindeer moss for him to stand upon, plenty of water for him to bathe in or drink, and a moderate supply of food for his sustenance. Although we had some warm weather, he was in perfect health throughout the season, and is now in excellent condition. At first I kept the barred owls away from him, fearing that they might murder each other, but later experiments showed that Snowdon had no ill feeling toward the barred owls, and ignored

them even when they stole his portion of the food. It is now six months since I turned them in together, and during the whole of that time the four birds have been on terms of quiet indifference.

About the middle of September, 1891, a Boston dealer sent me a mature great-horned owl. He reached my country place just in time to be sent back to Cambridge with the snowy and barred owls. Clipping one of his wings, I placed him with the others in the 250 square feet of cellar space fenced off for them. Puffy prepared for war, Fluffy fled, Prince Edward regarded the stranger with indifference, and Snowdon and the great-horned formed an alliance at once. Three months have passed, and, so far as I know, no conflict has occurred. The older barred owls fear and dislike the great-horned. Prince Edward treats him with brassy familiarity, and Snowdon stays with him in the corner of the cellar farthest from the favorite perch of the barred owls.

Having introduced my characters, I will now compare them in several particulars. They arrange themselves, when I think of them as owls merely, into two groups — the brown owls and the gray owls. The great-horned, long-eared, screech, and Acadian owls seem to me much alike in disposition and their way of meeting man. They seem like kindred.

The barred and snowy owls, while quite different from the brown owls, are somewhat alike in temper. They show fight when approached, and are very alert. The barred owls make several different sounds expressive of various emotions. They snap their beaks furiously when warning an enemy; they whine when hungry; they make a soft, rather musical "ōō" when meeting after an absence; they chatter with rage when pulling in opposite directions on the same bird or mouse; and they hoot when expressing the sentiments which make the domestic cock crow. While young they make a queer chuckling chatter when cuddled, and as the sound grows faint it suggests the music of a brood of chickens nestling under their mother's feathers. The hooting varies. In the August twilight I often hear the loud trumpeting "hōō" uttered at intervals of half a minute or more by wild owls in the woods. The common hoot, which suggests to some ears feline music, is generally "hoo-hoo hoo-hŏŏ, hoo-hoo hoo-hōō," but I heard a barred owl this winter in a remote White Mountain valley say "hoo-ŏŏ, hoo, hoo, hoo, hoo, hoo, hoo-ōō." He was a conversational and inquisitive bird. By hiding in some evergreens and hooting to him I drew him little by little to the treetop just above me.

Wholly different is the conversation of the

snowy owl. His warning is sometimes beak-snapping, but oftener an open-mouthed, hissing "āh," which has a most menacing quality. He occasionally utters a shrill, whistling scream expressive of pain or the fear of pain, yet he makes it also when snatching a morsel of food held toward him. Thus far I have heard my great-horned owl make but four sounds: terrific beak-snapping; āh-ing quite equal to Snowdon's; a hooting which suggests wind sighing in a hollow tree, and taking the form of "whōō, hoo-hoo-hoo, whōōō, whōōō"; and a series of soft, musical notes, rolled from his throat when Snowdon comes too near his clutched breakfast.

My barred owls eat raw butcher's meat, mice and squirrels, bats, any kind of bird, hawk and crow included, fresh fish, lake mussels, snakes, turtle-meat, some species of frog, earthworms, some kinds of insects, and hen's or bird's eggs. They will not touch toads or the frogs which secrete an offensive scent. They rarely eat tainted meat or stale fish. Once they played for hours with a dead weasel, much as a cat plays with a mouse, but they did not eat any part of it. They catch living fish from a tank, and kill mice, squirrels, birds, frogs, and snakes; but they were at first greatly alarmed by a turtle, and a young hare running around their cage frightened them almost into fits. Puffy will face and put to flight

a cat or a dog, but a pig is a terror to him. When Puffy was only six months old he caught and killed a two-pound pullet; yet in March and April, 1891, he roosted night after night on the same perch with an old Cochin hen which had begun her stay in his cage by giving him an unmerciful trouncing.

So far as I have been able to ascertain, Snowdon will not kill anything, no matter how hungry he may be. He eats dead birds, mice, squirrels, fish, snakes, mussels, turtles, if opened, and butcher's scraps; but he will make no effort to catch or kill a squirrel, mouse or snake, although shut up with them while hungry for a day or more. In one instance of this kind he ate a squirrel which he had allowed to live for twelve hours, as soon as it was killed and given to him. I have seem him drink once, and only once. If he bathes, it is a rare occurrence and done secretly. Early one morning in August, 1891, I heard a splashing in the owls' water-tank. It was about 3.30 A. M. Creeping to the cage, I peered in, and saw Snowdon shaking himself, as though he had just finished a bath.

His method of eating is suggestive of a carrion eater. The barred owls are deliberate in their way of treating their food. They search for and crush joints and finny projections. In a frog they feel of every limb from end to end,

and crunch away at the joints until they are mellow. They generally pull out the stiff wing and tail feathers, even in quite moderate-sized birds. Small snakes they swallow squirming. Snowdon, on the other hand, ignores live snakes, and his first act with dead food is to swallow it whole if he can possibly distend his throat far enough to let it pass. I have seen the head of a large rooster vanish down his throat, bill foremost, without his making any effort to crush it. Often a piece of food will stick in his throat and refuse to go down, in spite of vigorous jerks, jumps, and convulsive swallowing. It is then ejected and sometimes dropped altogether. With a large piece of meat or fish his method is different. Standing upon it, he snaps at it viciously and tears off small bits, in eating which he makes a smacking noise. Engaged in this way he is a disgusting spectacle. His head is poked forward, and the feathers upon it seem flattened. The hairy feathers around his beak are drawn back, and his red mouth is open much of the time. If disturbed while eating, he makes his shrill and extremely piercing cry. He is perfectly willing to be fed by hand, snapping at and bolting morsels of liver as fast as they are passed to him. He sometimes eats enormous quantities of food in a short time. He ate the whole of a full-grown bittern in twenty-four

hours, and on another occasion a cooper's hawk placed before him at night had only one leg and a few feathers remaining in the morning. Like other owls, he ejects hair and bone pellets from his mouth.

The great-horned owl is not so ready to be fed. He prefers to eat while alone. Mice, however, are too attractive to be refused, and whenever held before him are slowly and quietly taken and swallowed. Other food he usually pretends not to see until I have left him. He seems ready to eat anything that the other owls like. I know that he has bathed at least once this winter, and, judging by his plumage, he uses water freely. When given a cod's head or a large bird, he stands upon it and tears off morsels much as Snowdon does. His motions in doing this are sudden and his whole expression fierce and tiger-like. With horns slightly flattened and eyes glaring, he first plucks a piece of flesh from the carcass and then turns his head sharply from side to side to see whether any other owl dares to intrude upon his repast. My barred, snowy, and great-horned owls all feed freely in the daytime. My screech owls, on the contrary, usually waited until dark before devouring their food. One of them apparently ignored a live English sparrow for several hours while daylight lasted and the sparrow was able

to see him, but when night came the sparrow was speedily caught, plucked, and eaten.

The feeling with which other birds regard an owl seems to be a mixture of curiosity, hatred, and fear. Curiosity impels them to approach, hatred causes them to make violent and abusive cries, while fear inclines them to wariness and prevents them from open attack upon their sphinx-like enemy. This feeling of the birds is general, almost universal, and is shared in a modified form by the smaller owls when brought in contact with large ones. To the chickadee or the warbler it makes no difference whether an owl is large or small; he is an owl, and that prompts inspection and vituperation. In several instances I have found Acadian owls in the woods in consequence of the racket made by birds scolding them. This winter, on the day after Christmas, I was walking through a spruce thicket in Albany, N. H., when the noise of nuthatches, Hudson Bay and black-capped titmice and kinglets enticed me into the darkest part of the growth. The birds were greatly excited, and as I softly drew near them I saw that they were in a circle, all facing toward some focus invisible to me. I crept farther, and saw the tail of a small owl projecting from behind the trunk of a tree. Presently his tiny monkey face was screwed around over his back, and his timid yellow eyes

fixed themselves upon me. His tormentors soon flew away, and after studying me attentively for some time, the little Acadian floated off out of sight also.

The young screech owl, whose death at his brother's hands I have already mentioned, irritated the birds of the forest and meadow in the same way. I placed him, one morning, upon a birch-tree which was in use by a family of yellow-breasted woodpeckers as a sap-drinking place. The sapsuckers made a great clamor on seeing him, and their cries called together all the birds which were within earshot. At least thirty individuals came, including kingbirds, cuckoos, catbirds, veeries, chickadees, four or five kinds of warblers, red-eyed vireos, song sparrows, and two humming-birds. Having scolded for nearly ten minutes, they departed, leaving a sapsucker and a humming-bird, which soon forgot the owl and resumed their usual employment of drinking the birch-tree's sap.

Several times during the summer of 1891, I took my snowy owl out to walk. He weighs three and a half pounds, so the task of carrying him by hand upon an outstretched stick was rather a laborious one. The birds noticed him at once, and scolded as though he were of a species with which they were unpleasantly familiar, instead of one with which they were presumably

wholly unacquainted. Thrushes of various kinds, warblers, vireos, swallows, and sparrows treated him precisely as though he had been a barred owl. Once a grouse, with a family of chicks, confronted him boldly for a moment, while her brood scattered to cover. His conduct while at liberty was somewhat peculiar. He shunned the woods, and if taken into them, quickly made his way out. His left wing being clipped, his only method of advance was by clumsy leaps, or by a queer wobbling run, aided by outstretched wings. Whenever I placed him upon the ground, he would hurry away to a distance, and stop to pant with his wings dragging wearily at his sides. One warm morning I left him on an open pasture hillside, and walked away to a belt of woods nearly an eighth of a mile from him. Concealing myself in the bushes, I watched him closely through my glass for an hour and a half. The time was nearly a blank. The owl, satisfied that I had gone, walked toward me about a rod and sought the shady side of a small patch of juniper. There he remained almost motionless for the entire period. Sometimes he turned his head and watched crows at a distance. Once or twice he glanced at the sky, and in one instance he followed with his eyes the flight of a small bird. Looking toward the sun did not seem to affect his vision. That he could see things at a dis-

tance was shown in several ways. When I came slowly from my hiding-place he saw me at once, and started jumping down the hill away from me. On another occasion I took him out in a pouring rain, thinking that he would go to the woods for shelter. He was content with standing under a small apple-tree which gave him practically no protection, a fact which he discovered and sought to remedy by running to another tree of the same kind. Inactive, unable or unwilling to kill mice or squirrels, even when most hungry, silent, vacant in expression, cowardly, apparently stupid, the snowy owl, judged by my one captive, is a dull and uninteresting member of an unusually acute family. I doubt Snowdon's being a fair type of his species.

The barred owls are the particular abomination of other New England birds. They are courageous, keen of vision by day and in the twilight, strong, alert, quick, yet crafty. Their voracity makes them the terror of every nesting mother, the scourge alike of the forest, the field, and the meadow. Of their merits as decoys there can be no doubt. If taken while young and clipped, they are readily tamed and taught to obey simple orders. Mine have been invaluable to me in studying the birds of New Hampshire. When going for a walk, I take one or both of the older ones. Entering their cage, I extend a short stick

toward and on a level with their feet, and say, somewhat sternly, "Get on." They generally bite the stick once and then step upon it, and cling to it patiently while I carry them through any kind of country. When I wish to have them attract other birds I hold them toward a convenient branch and say, "Get off," which they are very willing to do. Then by whistles or cries I attract some bird's attention, and if it proves to be a titmouse, a woodpecker, a thrush, or some other excitable bird, the alarm is given, and from all quarters the neighbors come pouring in to join the tumult. Even while holding Puffy on a stick and walking with him, I have had birds attack him. Once a pair of solitary vireos followed me for some distance, one of them flying between my head and the owl three times, apparently not noticing me any more than though I had been a tree. A similar attack from a sharp-shinned hawk was more surprising than pleasant. Some species are less demonstrative than others, and seem to think silence and retreat wiser than vituperation. Cedar-birds, great crested fly-catchers, and scarlet tanagers are three species which seldom greet Puffy noisily. Game birds, as a rule, are too much afraid of me to remain near the owl, and the same is true of water-fowl. Loons have, however, shown curiosity on discovering Puffy, and sandpipers clearly dislike him.

I tested this in an amusing way one day, by taking Puffy out in my boat to a point just to windward of a solitary sandpiper, and then setting him adrift on a small board. At first the sandpiper did not see him, but as the wind carried the placid owl nearer and nearer the beach, the tattler suddenly discerned him, and became stiff with astonishment. He faced the owl, his head poked forward and his body rigid, then with a wild cry he flew, rising from the water and passing over the trees, away from the lake.

Whippoorwills are not easy birds to watch at night, but they usually fly toward the owl, uttering excited "clucks," and fly several times over it before going away to a distance. A mother night-hawk, with young, showed great courage and sagacity in dealing with Puffy. I placed the owl near her nest. She promptly flew down on the side of the owl away from her young, and fluttered in the grass as though wounded. Puffy hopped toward her. She flew a few feet, he followed, she flew a rod, he followed a third time. She flew three or four rods, and, as he hopped on, she rose and circled around him until, if he had seen her nest in the first place, he never could have remembered in which direction it lay.

The hooting of a barred owl in the daytime, or my imitation of the sound, almost invariably brings birds to the spot. Crows will come a long

way in response to the hated call. So will blue jays, and several of the hawks and woodpeckers, hermit and Swainson's thrushes, chickadees, and a few other small birds, including the siskins in winter. Crows, in a particular region, soon learn that a barred owl implies a man in the same thicket, but for the first two or three times, hooting will surely call them within short range.

Although game birds usually avoid the owl on account of my presence, a grouse with a large brood of young on one occasion showed much courage in watching Puffy. Her chicks scattered, but she remained in sight, whining and trailing her wings and doing her best to entice the owl away from the spot. Once she came within ten paces of him, her tail spread like a fan and her wings arched like an angry hen's. Puffy paid little attention to her, but seemed to be looking for the chicks which he had heard stirring in the leaves. Whenever he hopped she rushed into view, whining. She remained near by during the whole of twenty minutes that I spent in her domain.

In July, 1891, Puffy had a face-to-face meeting with a wild barred owl. Puffy was perched upon a stump facing a hemlock forest. Suddenly he became rigid and assumed a very unusual attitude for him, his head being thrust forward and his body flattened so that his breast

rested upon the stump. Following the direction of his steady gaze, I saw a fine specimen of his race in the dark forest. He was as rigid as Puffy. How long they would have glared at each other I cannot tell, for it began to rain, and the stranger flew away.

The hearing of all species of owls known to me is marvelously keen; so keen in fact that I know of no way of testing it, since it is so much more acute than that of man. If owls have the sense of smell, I am unable to find satisfactory evidence of it. I have tried various experiments with them, hoping to prove that they could smell, but the results are all negative. They dislike putrid meat, but they bite it to ascertain its condition. They will not eat toads or frogs which yield an unpleasant odor, but they did not reject these species until they had tested them by tasting. They may be ever so hungry, yet they do not suspect the presence of food if it is carefully covered so that they cannot see it. This test I have applied with the utmost care to the great-horned, snowy, and barred owls. The latter are shrewd enough to learn my ways of hiding their food, and when they suspect its presence they will search in the places where I have previously hidden it, pouncing upon pieces of wrapping-paper, and poking under feathers and excelsior with amusing cunning. I tested them with the

fumes of camphor, ammonia, and other disagreeable and unusual smells, but they failed to show that they perceived them unless the fumes were strong enough to affect their breathing or to irritate their eyes. Finally, I put a cat in a basket and placed the basket between the two owls. They were utterly indifferent to it until the cat made the basket rock, when both of them fled precipitately, and could not be induced to go near the basket again. Although Puffy will put a cat to flight when on his mettle, Fluffy is frightened almost out of his wits by them.

A Japanese toy-bird, made of a piece of wood and a few scarlet feathers, was eagerly seized by Puffy, indicating not only a lack of power of smell, but the presence of an appreciation of color. I have fancied that an appreciation of color is also shown by barred owls in their frequent selection of beech trees as nesting-places, by great-horned owls in their choice of brown-trunked trees, and by Snowdon in an apparent preference for gray backgrounds.

To this real or imaginary ability of the owls to select protective backgrounds is to be joined an undoubted power of assuming protective shapes. My great-horned owl can vary at will from a mass of bristling feathers a yard wide, swaying from side to side as he rocks from one foot to the other, to a slim, sleek, brown post

only a few inches wide, with two jagged points rising from its upper margin. When blown out and defiant, his bill is snapping like a pair of castanets, and his yellow eyes are opening and shutting and dilating and contracting their pupils in a way worthy of a fire-breathing Chinese dragon. In repose he is neither inflated nor sleek, but a well-rounded, comfortable mass of feathers. The barred owls go through the same processes of expanding and arching out their wings when awaiting attack, and of drawing all their feathers closely to their sides when endeavoring to avoid observation. As noted before Puffy once escaped into the woods, perched upon a small oak stump, drew his feathers into such a position that he seemed a mere continuation of the stump, closed his feathered eyelids until only a narrow slit remained for him to peep through, and stayed perfectly stiff for an hour while I hunted for him high and low. I passed by him several times without bringing my eyes to the point of recognizing him as a living thing. This power is shared by the screech owl and the long-eared owl. The plumage of the snowy owl is so solid that he seems more scaly or hairy than feathered. He does not, so far as my specimen shows, expand and arch his wings. Instead of standing straight and becoming slim and rigid, he crouches and flattens

himself when seeking concealment. I can imagine him in his Labrador wilds crouching thus amid a waste of junipers and reindeer moss, and baffling the eye which sought to detect him there.

The control which owls have and exercise over their feathers is not limited to moments when they wish to appear terrible or inconspicuous. They seem to ruffle them or smooth them, expand them or withdraw them in queer ways at pleasure. The barred owls, when stepping stealthily across a floor after a dead mouse drawn by a thread, tuck up their feathers as neatly as a woman holds her skirts out of the mud. When eating, the feathers nearest the mouth are pulled aside in a most convenient way. When wet, the feathers seem to shake themselves as well as to be shaken by motions of the body, head, and wings. My wife, in making a water-color sketch of Snowdon, complained that, although she could not see him move, he changed his outline a dozen times in an hour.

The owl's eye is his most useful member. The popular belief that the owl is seriously blinded by light is almost wholly unfounded, at least so far as the species of which I am writing are concerned. When a man approaches an owl in broad daylight the owl, in nine cases out of ten, will close his eyes, and so appear sleepy. As I have already explained, this is an effort to escape

notice by the assumption of a protective shape. That it is not due to any dread of light or inability to see is shown by the following instances of perfect seeing by owls in bright daylight. Walking through a Cambridge road in March, 1891, I saw an Acadian owl perched on a willow limb about fifty feet from me. His plumage was stiffened and his eyes nearly shut. I approached him and slowly raised my hand toward him. Suddenly his eyes opened wide and glared at me. Then the soft wings spread and he fell forward upon them, and flew toward the sun to a distant perch. The Acadian owl already mentioned as having been seen in December, 1891, in the spruce forest of the Swift River valley, watched me keenly, and swung his small head around after the manner of owls, trying to see me clearly from more than one point of view.

The screech owl which I first owned, although shamming sleep one morning when I entered the room where I kept it, pounced upon a dead mouse which I let fall upon the floor, and flew off with it before I realized what had happened. One of my three young screech owls when only two months old tried to catch a sap-sucking woodpecker which had perched near it in the sunlight on a dead tree. My snowy owl, as I have already stated, watches birds flying across the sky at a distance, and once saw me as I slowly

emerged from the woods an eighth of a mile from him. Great-horned owls are well known to be active by day, and not inconvenienced by sunlight. The barred owls, however, exhibit the most marvelous powers of sight, and their eyes may well be called telescopic. In dozens of instances Puffy has seen, and by his fixed watching of the sky has called my attention to, hawks flying at so great a height that they were well-nigh beyond man's vision. More than this, he has on two or three occasions seen a hawk approaching in the upper air when my eyes, aided by a fairly strong glass, failed to see the bird until it drew nearer and grew large enough for me to detect it as a mere dot in the field of the lens. My eyes, by the way, are rather stronger and more far-sighted than the average. If the bird thus sighted by Puffy is a hawk or an eagle, he watches it until it is out of sight. If it proves to be a crow or a swift, he gives it merely a glance and looks away. The barred owls frequently look at the sun with their eyes half-closed for fifteen or twenty minutes at a time. Why they do it I am wholly at a loss to explain.

I am in doubt as to how much Puffy can see at night. I once held a cat within a few inches of him in the darkness, and he did not stir. Had he seen it, he would certainly have moved and probably snapped his beak. In August, 1891,

I let him out after dark on a patch of closely cropped grass where the dim light enabled me to see him when he moved. I went to the nearest tree and seated myself with my back against its trunk and my legs stretched out before me. Half an hour passed, Puffy scarcely moving except when a bat flew over him, and I keeping perfectly motionless. At last he came toward me, slowly, a yard or two at a time. When he was within a few feet, I could see his outline quite plainly. One more hop brought him to my knee, upon which he jumped. Instantly he bounded into the air and made off, unmistakably frightened. He had no idea that he was going to strike a leg and not a log; yet if his eyes had been much keener than a man's he would have seen not only that my clothes were not wood, but that I was leaning against the tree trunk watching him. In several instances I have called wild barred owls at night and have had them alight in treetops close above me. I could see them against the sky, but apparently they could not see me sitting among the brakes and bushes below them. Once with an owl thus above me I imitated the squeaking cry of a wounded bird. I wished I had not, for the owl's ghostly wings brushed past my face so closely that I fell back into the bushes, fearing that he would strike at me again.

The memory of my owls is noticeably good. Puffy and Fluffy, the two barred owls which I have had longest, remember their favorite perches from season to season, and resume their chosen roosts after months of absence. In one instance Fluffy, on his return to Cambridge after four months in the mountains, flew the length of the cellar, expecting to strike a perch which had been removed, and, failing to find it, fell to the floor. It is only necessary for me to bring a box-trap into the barn for Puffy to come to the front of his cage, eager to be given a chance to catch the chipmunk which past experience leads him to believe is in it. Similar eagerness is shown in winter, when I bring a paper parcel into the cellar, the owls knowing so well that it contains food that they will tear it open themselves if I do not open it for them. If the bundle is brought in without their knowledge and thrown at random upon the floor, they do not find it, and will leave it for days untouched. Puffy does not like going out in my boat. If he finds that I am taking him to the shore near it, he invariably jumps off his stick and tries to hide in the bushes. Snowdon knows a piece of cloth which I have used to throw over his head when I have wished to handle him, and the sight of it is enough to cause him to make strong efforts to escape from his cage. All three of the barred owls hide their

surplus food, and remember where they keep it. Snowdon, on the contrary, sometimes stands over portions which he is not ready to devour, letting his feathers sink down so as to cover them. Puffy not only understands the commands "Get on" and "Get off," but he knows his own name, and generally answers when I call him by giving a friendly "clap, clap," with his beak. He has frequently revealed his position to me by this answer when I have lost him in the bushes, tall grass, or at twilight. That he especially, and all my other owls to a less degree, know me and distinguish me readily from strangers, is, I think, undoubtedly a fact. Thus far I have been unable to see that any of the owls have a clear notion of time, except as indicated by the coming or going of daylight. The digestive workings of owls are extremely economical. In summer the birds have enormous appetites, and become frantic with hunger if not fed every forty or fifty hours. In winter, on the contrary, the mature birds fast for a week or more without complaint. During the winter of 1889–90 I could not ascertain that Fluffy ate anything for more than a month — that is, from Christmas-time until the first week in February. Throughout this period he seemed well, though inclined to keep quiet and to stay in the darkest corner of the cellar. When fed regularly and amply, all the species

of owls with which I have had any experience cast from their mouths egg-shaped "pellets," composed of the bone and hair, fish-scales, and feathers which remain in their stomachs after the digestion of the more nutritious parts of recent meals. This ejection is accomplished easily and quickly, with very little visible muscular action. It usually, or at least often, takes place at the moment when the owl has another hearty meal in view. The owls' furnaces burn nearly all that goes into them. Considering the amount of fuel put in, the extremely small amount of ashes is wonderful.

In disposition my owls vary widely. The barred owls are — as owls go — remarkably sweet-tempered and gentle. I never have seen one offer violence to another, even when two were struggling over a morsel which both were determined to have. Snowdon is sullen, stupid, cowardly, and treacherous. The great-horned has a temper, but he generally keeps it concealed under an air of dignified reserve. My screech owls, when not shamming sleep or death, were irritable, quarrelsome, and ferocious. Between my three barred owls there are individual differences in disposition, which are readily learned but not easily described. They stand out distinctly in my mind as three characters, just as three children or three horses would be distin-

guished when I thought of them. I feel as much attachment for Puffy as I possibly could for an intelligent and faithful dog. His crippled wing has probably made him unusually docile and tractable, but, whatever may be the cause of his goodness, he certainly is a model of patience, placidity, and birdly virtue. This, in combination with pluck, which leads him to charge upon and vanquish dogs, cats, and domestic fowls, and a magnanimity which enabled him to roost for weeks alongside of an old hen, will make him worthy of owlish canonization when in good time he is gathered to his fathers.

(FROM MR. BOLLES' NOTES.)

March 28, 1893. I took four small mice to the door of the owls' cage. It was a week since the owls had been fed and they were very hungry. Fluffy was on a barrel close to the door. I called Puffy, and swung a mouse by its tail so that Fluffy near by, and Prince Edward eighteen feet away, could see it. Prince Edward at once flew up to the barrel. I called Puffy again. Then I tossed the mouse into the air and Fluffy caught it, going to the floor with it, and holding it in his mouth until Prince Edward came to him. Then Fluffy poked his head forward quietly, and gave Prince Edward the mouse. Puffy then came from the back corner of the cage,

and I gave him mouse number two. I tossed mouse number three to Fluffy, who caught it in the air and forthwith gave it to Puffy, advancing to do so. Fluffy also caught mouse number four and held it nearly two minutes before Prince Edward came down, walked up to him, grabbed it from him chuckling, and ate it. Then Fluffy looked up to me for more, but I had none.

Monday, April 3d. I gave Fluffy a mouse. He held it in his mouth and looked long at Prince Edward, then at Puffy, and finally flew to the latter and offered it to him; pushed it against his beak in fact. Puffy had a chunk of meat in his mouth and would not take the mouse. Fluffy then offered the mouse to Prince Edward, making many times a very curious "cluck, cluck, cluck, cluck," which closely resembled the calling of a domestic fowl. Prince Edward refused the mouse, and Fluffy offered it in vain first to one then to the other for ten minutes, clucking as he did so.

BIRD TRAITS.

WHILE birds as a race have many habits and instincts in common, their family differences are strongly marked. The hawk and the humming-bird answer equally well to the scientist's definition of a bird, but Napoleon and a bonbon maker answer equally well to his definition of man. The destroyer and the confectioner, whether among men or birds, have different ways of looking at life, and of dealing with their animate and inanimate surroundings. In human communities the principal actors are the farmers, artisans, merchants, priests and teachers, soldiers, mariners, artists, knaves, and idlers. Perhaps I am over fanciful, but against each of these classes save one — the merchant — I can set without hesitation a group of birds whose life currents seem to me to run in as various channels as those of the great groups in human society.

My abstract farmer is a burly fellow who rises early, whistles cheerily if the sun be bright, works in all weather, keeps to the fields rather than to the forest, and to whose senses nothing

is more pleasant than the rustle of corn leaves and the sheen of grain undulating in the breeze. He is slow, persistent, graminivorous.

Against him in the bird creation I set the sparrow. The sparrows, buntings, and finches love the sunshine. They are interested in the crops; as a rule shun the gloom of the forest, and make their homes in fields and meadows. Before sunrise, in May, the clear whistle of the white-throat welcomes the coming dawn. When the snow first melts in April, or if by chance it wastes away in December or January, the snow buntings and juncos are promptly at work in the ploughed fields or among the weeds left in the potato patch. Winter does not see the farmer moving to Florida or Cuba. He stays under the shadow of Chocorua, breaking the ice in the pond for his cattle, scattering corn to his fowls, listening to the voice of the ice in the night, and having a gun ready for the fox prowling about the barnyard at dawn.

The birds around him in these wintry days are not warblers and swallows, vireos and thrushes; they are sparrows. Nine tenths of them are pine grosbeaks, crossbills, snow buntings, siskins, or those joyous creatures of the snow country, the confiding redpoll linnets. Truly, farmers and sparrows belong to the land, cling to it, live by it, love it. Their acts and instincts are inspired by it and have its color.

How different from the farming sparrows are the gulls and terns — children of sky and ocean, bred to the storm. They have no music. Their voices are shrill like the boatswain's. They have no home save a spot of sand or rock where their young are reared near thundering surf and moaning tides. Their lives are long-continued buffetings with wind and wave, — voyages under white wings across monotonous wastes of water. They are the mariners among birds, and all their ways have the mark of the sea upon them. The sea rules them, charms them, binds them to itself, and robs them as it robs their human counterparts of much of the sweetness and rest of home.

Not all of the birds which live among forests and flowers share in the sweetness of home life. There are among them, as elsewhere, discordant creatures who seem to draw no joy from joyous surroundings and whose deeds are full of selfishness and misappropriation of others' hopes and rights. Some of these birds carry their true character clearly written upon their faces. The cowbird is a sneak. Her glances are furtive. When seeking the home of a vireo or warbler, with the intent to thrust her egg upon the mercies of a stranger, she tells in every motion of her body the tale of her inherited wretchedness and conscious guilt. The hawks and owls bear in their faces the imprint of evil. There is something

in the expression of a dying bird of prey which suggests the agony of sin buried in remorse which comes too late.

Owls and hawks are murderers by night or robbers by day. There is something inspiring in the sight of a great bird with wonderful powers of vision and flight soaring higher and higher towards the sun. Man cannot imitate his flight; but there are men who do in spirit what the hawk or eagle does in the flesh. They withdraw their business plans and purposes far from the ken of their fellows and expected victims, and then from their vantage point descend to strike suddenly with the swiftness and cruelty of the plundering eagle.

The owl reminds me of some men whom I have had the misfortune to know — silent and sinister by day or when exposed to the scrutiny of their fellows; taking without reply or blow the taunts and abuse of those whom they have wronged; but by night devils in thought, purpose, and action. To the owl everything which possesses the power of motion is, presumably, fit to be devoured; quadruped, bird, fish, reptile, insect, mollusk, any or all, unless specially protected, invite to murder; so with some men, nothing is too pure, too beautiful, too defenseless to be sacrificed to their selfishness. One owl is enough for many miles of forest. Fortunately for society, owlish men are similarly scarce.

There are some birds of deservedly bad repute who wear an attractive exterior and maintain jaunty manners. The blue jay, for instance, though somewhat flashy in his dress and loud in his voice, passes with the unsuspecting as a bird worthy of confidence, if not of admiration. Yet if ever there was a scoundrel in feathers, he is one. He is my ideal pickpocket, shoplifter, smuggler, and confidence man. Most people think his cousin, the crow, an undoubted villain; yet he is considerably better off in morals than his gayly dressed relative. This is not saying that the crow is not a blackleg.

Among men, the class usually victimized by rogues is that which is dressed and fed well, and luxuriously housed. There is such a class among birds, as the rogues rejoice to know. The warblers toil little, talk much, live well, dress gayly, — always *à la mode*, — and dwell in elaborate and beautiful houses. Redstarts, yellow-rumps, black-polls, and bay-breasteds make elaborate changes in their costumes. The parula lives in the most dainty of summer houses. The Canadian warbler wears a necklace of black pearls. The Maryland yellow-throat goes to a masque ball in a black domino every night in the season. There is nothing solemn or melancholy to these light-hearted, frivolous little birds. No sooner is there a chill in the air, a breath of something

coming after August sunshine, than these children of the world start southward, not to return until all traces of snow have vanished. Truly the warblers must be counted the *élite* of bird society ; but they are as surely the frequent victims of its knaves.

The surest way to tell shoddy is to hold it against the true fabric. The same is true of shoddy people and shoddy birds. Mr. and Mrs. Tanager, he in scarlet coat and she in yellow satin, are best measured by contrast with the refined warblers. Their voices are loud, their manners brusque, their house without taste or real comfort. They have no associates, no friends. They never seem at ease, or interested in the misfortunes or joys of those beneath them. Unfortunately there are other Tanagers in the world than those who wear feathers.

If the sparrows are by nature children of the soil and the warblers children of the world, the thrushes are without doubt the artists; the musicians of the wood. I have never met a lover of New England bird music who would hesitate a moment about placing the hermit thrush and his next of kin foremost among the songsters of this part of the continent. They are true artists. Their music is exquisite in itself, and their rendering of it is sincere and emotional. The hermit thrush resting upon the low, leafless limb of

a pine in the northern wilderness, and rendering his several phrases deliberately, smoothly, pathetically, is as true a musician after his kind as the first tenor in the great cathedral choir, whose sweet, sad tones vibrate through vaulted nave, carrying to listening hearts the interpretation of the composer's immortal passion. Again and again, summer after summer, as I have heard the song of this thrush, varying from the low, tremulous notes in his first phrase to the high, clear notes in the third, it has seemed to me that his song is to bird music what the Cujus Animam in Rossini's Stabat Mater is to the music of the Christian church.

The first tenor and the cobbler may live in the same street and be good neighbors to the extent of a cordial "Good morning" or "Merry Christmas." So the hermit thrush and the yellow-breasted woodpecker are neighbors and acquaintances. This woodpecker, commonly and justly known as the "sapsucker," is the noisiest fellow with his awl and hammer in the whole forest. He wears a red and black cap and a yellow apron. His voice is loud and unmusical. His motions are ungraceful and full of jerks. He is inquisitive and loquacious. If a brawl between an owl and a mob of chickadees and nuthatches breaks the stillness of the swamp, his work is forgotten, and off he rushes full of

noise to have a hand in the quarrel. His cobbling is effective. The second summer after his tapping and girdling of a canoe birch, from which he and his associates have drawn the sap, is usually marked by the unmistakable failure of the tree's vitality.

All the woodpeckers are artisans. They love the resonant tones of the trunks they tap or hammer, as the smith loves the ring of his anvil and the cooper the song of his hoops and staves. The largest among them is most like the blacksmith. He is the logcock of the great northern forests. Black and strong, with a big voice and a temper, his eyes flash and his blows echo and cause ruin where they fall. He suggests an older age than this of steam sawmills and wasting forests "protected" against Canadian lumber. Just so the blacksmith seems a survivor of the age before machinery, when individual men made individual things, and division of labor and machines with replaceable parts were unknown.

Among the other artisan birds are the brown creepers, perpetually winding imaginary spirals round the trunks of the hemlocks; the nuthatches, titmice, and wrens. Fortunately for the trees, these little workers know nothing of strikes or lockouts. If the first tenor ever goes in search of bright eyes among the artisan's daugh-

ters, he must be charmed by the rippling, rollicking trill of the winter wren. Like the brook which flows through the forest, now underground, now rippling across a patch of sunlight, cold as ice, interrupted by darting trout, so the song of the wren comes, goes, flashes, disappears, rises into bold prominence, is varied by sudden changes and whims, and then ripples off into silence.

The teachers and preachers among men, who go about dispensing advice as to the way to avoid trouble, are well matched among birds by the vireos. The red-eyed vireo is merely prosy. His mild, tuneless platitudes soon become unbearable. The yellow-throated and warbling vireos are more effective. They touch the heart by the purity and gentleness of their chiding. But the solitary vireo is needed to play the *rôle* of the revivalist. When he sees that arch fiend in feathers, an owl, anathema pervades the neighborhood, and the population is treated to the most effective kind of dogmatic declamation. The bluebird is, however, my favorite reformer. There is a gentleness, a sweet persuasiveness to her discourse, even when a crime-soaked owl is addressed, that is very conducive to neighborly living.

It is not war-worn veterans who have counterparts among the birds, but the gay soldiery of

the parade ground. How impressive is the charge of the neatly uniformed cavalry, with colors flying, sabres flashing, and hoofs pounding on the cropped turf! The men lose individual life and move merely as part of the charging column. They are thrilled by the rush of air in their ears, and the glitter and flash of metal and color around them. So it is with the swallows and swifts charging through the summer sunshine and carrying dismay and death to the insect ranks before them. On a July evening I have seen four-score barn swallows with long slender forked tails, chestnut waistcoats and blue jackets appear with even ranks and uniform flight, sweep down upon the lake, skim its calm surface, and then, by some mysterious coincidence of will, wheel to right and upwards and soar far into the upper air, where sunlight still lingered upon Chocorua's summit. There is the same thrill, flash of color, presence of united determination and losing of the individual in the charging column, which are the special characteristics of cavalry. Late in August it is common to see great numbers of night hawks, gathering from a hundred pastures for migration, sail across the sky from west to east, with open ranks and even flight. I once saw a flock of nearly fifty redwing blackbirds, all males, in full breeding plumage, rise at once from a meadow, fly north, wheel,

fly west, wheel again, careening so that the afternoon sunlight flashed on every scarlet epaulet, and then fly southward and downward into the grass. If they had been held equidistant by wires and guided by one mind, they could not have moved with any greater regularity. At the time, and since, they have reminded me of crack companies of infantry wheeling at the word of command. I remember once, on a March morning, counting a flock of cedar birds, which alighted in an ash-tree by my window. They all faced in one direction, and numbered one hundred and forty. As I finished my count, it seemed as though every bird in the tree was moved by a single spring, for they went off so nearly together that I was unable to note the slightest difference in their start.

There are also birds which act the part of border pickets and sentries. The tyrant flycatchers, especially the pugnacious and keen-eyed kingbirds, are noted for their readiness to warn their neighborhood of danger and to engage an intruder in single combat, no matter what his size or strength.

I have named farming sparrows, artisan woodpeckers, preaching vireos, seafaring terns, music-loving thrushes, frivolous warblers, martial cedar birds, swallows, and blackbirds, and the criminal owls, crows, jays, and cowbirds. It would be

easy to go on and compare the humming-bird to a French dancing-master, the whippoorwill to an auctioneer, the bittern and heron to a patient angler, the woodcock with his bill in the mud to a tippler with his straw in the cider, the bobolink with his interminable and over-cheerful talk to a book agent or drummer. But these minor resemblances are less real and more whimsical. The ocean has really modified the character of the gulls and grebes, as it has the men and women who live upon it or near it. Life in the open field, pasture, and ploughed land has had a certain clear and distinct influence upon the sparrows and finches, just as it has had upon those who drive the harrow or sow the seed. But perhaps the clearest example of all of the influence of environment is afforded by the English sparrow, a bird which it is hardly necessary to say I did not have in mind when I wrote of his American relatives. City-bred man without knowledge of lake and forest, mountain and ocean, is an inferior product of the race; but disagreeable as he is, the city-bred bird is worse. The English sparrow stands to me as the feathered embodiment of those instincts and passions which belong to the lowest class of foreign immigrants. The Chicago anarchist, the New York rough, the Boston pugilist can all be identified in his turbulent and dirty society. He is a bird of the

city, rich in city vices, expedients, and miseries. The farmer's son who takes to drink and the East end makes a hard character. The sparrow who has taken to a similar form of existence is equally despicable.

INDIVIDUALITY IN BIRDS.

EARLY in the bright, still September morning, as I lie hidden among the bushes which fringe the shores of my lonely lake in the birch wood, watching the mists moving over the surface of the water and rising to obscure the trees on the farther shore, I hear a sudden creaking of wings in the air, and see shadows passing swiftly across the water. Then there is a splash, the lake breaks into ripples, frogs give startled croaks, and the gray squirrels in the oaks cease frolicking, and hide themselves in the armpits of great limbs, waiting for fresh signs of danger. A fleet has been launched upon the lake, and, in proud array, it stands away across the mist-hung ripples. Six trim little craft in close order plough the deep. Why is it that I have to lie very still, as I watch this energetic squadron at its sunrise manœuvres? Why can I not stand upon the sand and wave my friendly welcome to the beautiful wood ducks which have come to my lake? I should love to call them to me, feed them, caress their exquisite plumage, and marvel at the play of color in

their lustrous feathers; but were I to move a hand so that their keen eyes saw it, or to snap a stick so that their keener ears heard it, their wings would pound the water into foam, and in one brief moment all their grace and beauty would have vanished from my sight.

When the first snow falls upon the frozen November pastures, burying the dry grass and brown ferns, and leaving only the ghost-flowers of goldenrod, aster, and fireweed, fox-tracks are many upon the telltale carpet of winter. They begin upon the flanks of Chocorua, or away to the west among the boulders on Great Hill and Marston Hill, where the battle of the wolves was fought long ago, and come southward or eastward through birch wood and pasture, larch grove and swamp, to the lakeside and meadow. Many a mile every hungry son of Reynard travels over that first snow, searching for mice or a plump blue jay to pounce upon. If, as I lean upon a great gray boulder in the middle of the wide upland pasture, I see a slender, sharp-eared fox trotting towards me, can I whistle to him as to a dog, and tempt him to me by holding up to him the mouse I have just taken from my trap? With the speed of a thought he will dash from me towards yonder beech wood; at its edge he will pause for one last look of hatred and terror, and then silence and the snow will

seem to deny his ever having been within their dominion. Why does he shun me, when I have never harmed him, and would not have harmed him had he come to me?

If I steal ever so softly to the mossy bank of the meadow brook, and peep through the ferns into the deep pool overhung by the thick turf, the wary trout which lies poised in the cool current, with filmy fins pulsating, will see me, and seeing, strain every muscle of his marvelous form to hurl himself from me into some hidden grotto far down the stream. If a butterfly, opening and shutting its yellow wings on the milkweed flower, sees my shadow creeping towards it, the golden wings will move with vehement power, and, high above me in the August sunlight the distrustful insect will linger, bidding me by its restless unhappiness depart from its milkweed.

By night, as by day, the life of the forest, the field, and the water shuns me. The bat, which flits back and forth with crazy flight above the lake, avoids me; the hare, leaping lazily through the grass where the moonlight sparkles in the dew, bounds from me, panic-stricken; the owl, with silent wing, floats from me down the forest aisles, and hoots no more. What have I done that creation should spurn me as a leper, and that all which is most beautiful in animal life

should hasten from me as from death? The answer is plain: my crime is that I am a man.

. . . . . .

There are hundreds of intelligent men and women in New England who do not know a bluebird from a blue jay, a chickadee from a junco, a catbird from a cow bunting. They know them all as birds, and love them as such, after a vague fashion, but of the racial or specific characteristics of these charming creatures they know nothing. What, then, will they say to the avowal that not only do species of birds differ from one another, as Irishmen differ from Swedes, and Spaniards from Chinese, but that individual birds of the same species have, in proportion to the sum total of their characteristics, as much variation as individual men? Of course, there is not nearly the same chance for individuality in birds as in men, for their methods of life and their mental qualities are simple, while those of men are complex.

To the wood ducks, the fox, the trout, and the butterfly I am merely a man, one of that horrible race of gigantic destroyers which occupies the land and the water, and, with merciless hand, traps, maims, or kills with indiscriminate cruelty. For centuries, all that dwells within the woods or beside the waters has held firmly to life in direct proportion to its distrust

of man and its ability to elude him. No wonder that, to the bird, a man is merely a man. The preponderance of evil in man's treatment of the lower animals makes it impossible for wood duck, fox, or trout to delay flight to determine whether the individual man who appears by the lake or in the pasture is impelled by kindness or by a desire to commit murder.

Those who know birds only as birds, without separating them into races, species, or individuals, have no such excuse to offer for their failure to distinguish and appreciate. They are not hunted to death by the fair creatures which people the wild world around them. They have ample time and more than ample provocation to learn something of these shy, sweet neighbors. No lifetime is long enough to learn all about even one bird; but there are few men who do not sometimes pass beyond the limits of brick walls and cobblestone pavements, and whenever they do pass such limits the birds are with them. In our own Boston, gulls, crows, and several kinds of ducks are constantly present along the water's edge, between late autumn and spring. The Common and weed-grown vacant lots are not owned by house sparrows alone, conspicuous as those immigrants are. A Sunday afternoon in May spent in the groves and fields of the suburbs gives acquaintance with more species

than there are hours in the day, and close watch for an hour of any one bird may yield a fact which no naturalist has ever recorded.

I have a friend who lives alone, summer and winter, in a tiny hut amid the woods. The doctors told him that he must die, so he escaped from them to nature, made his peace with her, and regained his health. To the wild creatures of the pasture, the oak woods, and the swamps he is no longer a man, but a faun; he is one of their own kind, shy, alert, silent. They, having learned to trust him, have come a little nearer to men. I once went to his hut when he was absent, and stretched myself in the sunlight by his tiny doorstep. Presently two chickadees came to a box of birdseed swinging from the pine limb overhead, and fed there, cracking the seeds one by one with their bills. Then, from the swamp, a pair of catbirds appeared, and fed upon crumbs scattered over the ground just at my feet; a chipmunk ran back and forth past them, coming almost within reach of my hand; soon after a song sparrow drove away the catbirds, and then sang a little *sotto voce* song to me before helping itself to the crumbs. When my friend returned, he told me the story of this song sparrow; how he had saved its life, and been rewarded by three years of gratitude, confidence, and affection on the part of the brave little

bird. He seemed fearful lest I should think him over-imaginative in his recital, so he gave me details about the sparrow and its ways which would have convinced a jury of the bird's identity and strong individuality. The secret of my friend's friendship with these birds was that, by living together, each had, by degrees, learned to know the other. *A* man had become *the* man, and in time he had developed into protector, provider, and companion. They, from being chickadees, catbirds, and song sparrow, had separated themselves from their several species, and, by little habits and peculiarities of color, had made themselves plainly recognizable as individuals, having characteristics not common to all their species.

It is easier to feel sure that these individual peculiarities of a bird are real if the bird is a captive, or if, as a wild bird, it is marked in some unmistakable way. My chief experience with birds of whose identity I could feel no doubt while watching them, hearing their voices, or seeing their pictures, has been with a number of owls which I have retained as captives for various terms of months or years. To a stranger, these birds would be quite indistinguishable both from one another and from wild birds of the same species. He would notice only the points of resemblance, the marks by which he

determined their species. I should notice only their points of difference; and I should find among such points color, size, posture, gesture, expression, and manner. Not only would these points make it impossible for me to mistake one owl for another, but they would give me some passing impression as to the bird's temper at the moment; for a placid, sleepy, well-fed owl is a very different bird from the same owl irritable, wide awake, and starving, after a three days' fast.

We distinguish members of our family or of our circle of acquaintances one from another by the differences in their figures, features, and dress; the motions they make, the sounds they utter; their conduct, opinions, tempers, appetites, virtues, and failings. I distinguish my three barred owls from one another by slight differences in size, in coloration, attitude, motions, notes, temper, appetite, and degrees of intelligence. They are not always in the same plumage; their appetites vary; they make different sounds under different conditions; and the one which is most docile in midwinter may, when moulting, be most irritable and prone to bite. One of them almost always whines when I approach his cage; the other two never whine unless unusually hungry. One comes to me when I call him, provided he thinks he is to be

fed; the other two have never learned their names. One is a coward, and always seeks safety in swift escape when any danger threatens, while his original nest companion is as brave as a lion. I once placed the latter in a small room with two hounds. The dogs advanced towards the owl with faces expressive of great curiosity. The owl spread his broad wings, ruffled the feathers upon his back, snapped his beak, and then, as the dogs came nearer, darted at them, drove them under a sofa, and held them at bay until they were thankful to be allowed to slink out by a back door. Nothing would induce either dog to return to the room that day.

These three barred owls were reared in the same nest, two in 1888, the third in 1891. They were all taken from the nest before they could fly, and they have been subjected to the same conditions while in captivity. So far as I know, they are of the same sex. In spite of these facts, they are no more alike than three dogs raised in the same kennels, three horses pastured in the same field, or three urchins starved and whipped in the same tenement house. They are not equally hungry, sleepy, or skillful in striking living game; they are not equally fond of sunlight or darkness; they select different perches, and look at life and their master in

three very different ways. In fact, they are individuals, not three dittos to the name "barred owl."

One summer I caught and caged three young sap-sucking woodpeckers, as they were preparing to fly from their ancestral castle tower in the Chocorua forest. It might fairly be presumed that three birds just out of the nest, and that nest a dark hole far up in a poplar trunk, would be as nearly alike as three dimes from the same mint. The opposite was true. Number One was a hardy bird, which flew the moment the axe was struck into the poplar's bole. Number Three was a weakling, that stayed in the hole until pulled out by hand. So it was later, as they grew older and larger. One was a bully, with a loud voice and too much animal spirits for the size of his cage. Another was quiet, meditative, and fond of a sunny corner of his box. In the autumn, when I let the birds out to frolic in a barn chamber, this quiet bird was always the last to quit his perch in favor of half-freedom. Number Three continued to be the smallest, weakest, and least hungry of the three birds; but she was quicker than Number Two, and seemed to get more out of life than he did. From the hour when I took these little birds away from their nest, I never failed to recognize each of them as having individual characteristics not possessed by the others.

The wild sap-sucking woodpeckers in the New Hampshire forests derive the chief of their diet from the sap of the common deciduous trees. Attacking the trees in April, often before the snow has wholly disappeared from the shady hollows and north slopes, they riddle the bark with dozens of small holes, from which the sap flows freely. Red squirrels, downy woodpeckers, and humming-birds like this flowing sap quite as well as do the sapsuckers, and they frequent the "orchards" more or less persistently. No stronger proof of individual differences in bird character has come to my notice than that afforded by the opposite kinds of treatment accorded the pilfering humming-birds by various families of sapsuckers. At some orchards it is only necessary for a humming-bird to be heard approaching the trees for the woodpeckers to be on the watch, ready to drive the intruder away. Fierce attacks are made upon the little birds, and they are never permitted to drink at the sap holes if woodpeckers are on guard. At other orchards the opposite is the rule, and a favorite humming-bird is allowed to drink when and where he pleases, provided he does not actually buzz in the face of his host, and attempt to sip from the cup in use. This difference in the treatment of the humming-birds is not a matter of daily whim, but is the

rule throughout successive seasons. I say this after having, by close watch of certain orchards, convinced myself that not only the same woodpeckers, but the same humming-birds, return to particular groups of trees year after year.

Once, on an August day, as I sat working at the north door of my big barn, near the foot of Chocorua, a small bird came hopping and fluttering towards me. As it drew near I saw that it was a young redstart, somewhat raggedly clad. The little creature was catching tiny flies and other insects, and seemed completely absorbed in its occupation, to the exclusion of fear or even ordinary caution. Presently it entered the barn, and hopped back and forth between the horse's heels, as he stood and stamped in his stall. Then it crossed the floor to me, and perched for a moment on my foot. I caught it, and it sat upon my hand fearlessly, going because a passing fly drew it from me. Finally it continued its course through the south door into the wide sunshine beyond, and so away forever. Truly, that tiny redstart was unlike all others of its species which I have seen, or ever expect to see. Daft it may have been, but it did me more good than fifty sane warblers.

Less clear evidence of individuality in birds comes in the way of every observer many times during each year. Spring after spring birds re-

turn to favorite nesting-places, and autumn after autumn migrants appear on favorite hunting grounds: sometimes we feel sure that the robins which return to the apple-tree, the bluebirds to the box on the post, the orioles to the trailing elm branch, are the same birds which built in those spots in preceding summers; but, as a rule, positive evidence to this effect is lacking, and our moral certainty is not capable of justification to others. Generally the fact which makes us most sure in our own minds that the birds in question are old friends is some hint of individuality on their part. They arrive on a fixed date in the spring, build their nest in a particular spot or in a particular way; and the exactness of the coincidence induces us to believe in individuality, rather than in the nature of all birds of a species to do precisely the same thing under similar circumstances.

Where there is a wide variety in the nesting ways of a species, the ability to fix upon certain birds and feel confident of their identity is increased. For example, I have known the song sparrow to build upon the ground in the middle of a dry field, or close to a tussock of grass at a brookside; a few inches from the ground, in a pile of brush in a meadow; in a dark pocket in the hollow trunk of a willow; two feet from the ground, in a spruce; and finally, eight feet above

the ground, in a cup-shaped hollow in a birch stump. It is evident that a species which varies the location of its home as widely as this must contain individuals which have their power of selection highly developed. The kingfisher's instinct takes him to a gravel bank, in the face of which he digs a hole. He is satisfied with one set of conditions, and those conditions are simple in kind. The song sparrow, which builds in a hollow willow, or in a depression in a high stump, has not been satisfied with simple conditions, but has exercised her power of selection to a remarkable degree in finally choosing very unusual surroundings for her home.

Much as birds of a species resemble one another, every collecting ornithologist knows how rare it is to find two individuals whose coloration and measurements correspond exactly. In series containing hundreds of specimens of the same species, it is almost impossible to find two skins which agree so closely as to be indistinguishable. Moreover, in such extended series, it is common to find specimens which vary in a radical way from the average. Not only does albinism occur, but other unusual features appear in color and form in a way to suggest reversion to some earlier stage in the development of the species. For example, I have seen several specimens of the cedar bird which had white

markings of a kind to suggest at once a common ancestor to both cedar bird and Bohemian waxwing. Differentiation increased the white plumage in the Bohemians, and allowed it to disappear in the cedar birds.

So sharp are the distinguishing lines of color between desert races of birds and mammals and races living amid verdure that it is natural to surmise that habits and conduct may also be considerably modified by arid surroundings. Taken as a great group, birds which live upon the sea are certainly very different from typical forest birds. Sea birds' voices, when they use them, are harsh and shrill, and they can scarcely be said to have a suggestion of song in their vocal performances. Nearly all land birds have music in their natures. If they cannot sing, they at least try to play. The grouse, the woodpeckers, the snipe, the woodcock, the bittern, are all instrumentalists. Land birds which sing, like the thrushes, the purple finch, fox sparrow, ruby-crowned kinglet, orchard oriole, water thrush, and other brilliant performers, are well known to vary in the individual success of their efforts. Now and then I hear a song sparrow or a hermit thrush which sings so much better than its fellows that I return to it day after day, to listen to it as to a Nilsson or a Scalchi.

If I, with dull human ears, can detect the dif-

ferences in birds' songs, how much more quickly can the birds themselves distinguish one another's voices! Watch a nestful of fledgelings whose eyes are incapable of distinct sight, and one of the first facts to be noted will be the sudden excitement of the young when the parent bird, in returning, comes within a few rods of the nest. The clamor of the young can be instantly silenced by a note of alarm from the parent, while no other sound in the neighborhood will check their glad uproar. Among full-grown birds, similar notes of warning are wonderfully effective. Crows chortling together in the woods will be quieted and called to wing by a single hoarse "caw" from their sentinel. A flock of blue jays, feeding in the oaks, will scatter like leaves in the wind at hearing a cry of alarm from one of their number. I never see or hear a crow "caucus" without feeling sure that certain individuals have more weight in the assembly than others, and that their cawing means something to their fellows. Of course, these indications of the appreciation of individuality by some birds in dealing with their mates are vague and unsatisfactory as compared with the more direct evidence afforded by personally watching captive birds until their characters are thoroughly learned.

Two great-horned owls which I owned for a

few months were so radically different in temper that every one who came near them recognized the fact. One was quiet, dignified, and comparatively tractable; the other was belligerent, cross, and untamable. To my eyes, the expressions of their faces were as different as they would have been in two persons of opposite temperaments. That this difference in bird faces is real, and not based upon the circumstances of the moment, accidents of position and color, or my own state of mind, seems to me to be established by the fact that, in a series of photographs of my barred owls, taken at different periods, the identity of each owl in a picture is as evident to me, and to others who know the birds intimately, as though they were men and women instead of birds.

With me, belief in the individuality of birds is a powerful influence against their destruction. Like most men familiar with out of door life, I have the hunting instinct strongly developed. If a game bird is merely one of an abundant species, killing it is only reducing the supply of that species by one; if, on the contrary, it is possessed of novel powers, or a unique combination of powers, and can be distinguished from all its fellows, killing it is destroying something which cannot be replaced. No one with a conscience would extinguish a species, yet I already feel towards certain races that their individuals are as

different from one another as I formerly supposed one species of bird to be from another. At one time I should have shot a barred owl without a twinge of conscience; now I should as soon shoot my neighbor's Skye terrier as kill one of these singularly attractive birds.

Sentiment aside, bird individuality, if real, is of deep scientific interest. If we knew more of the influence of individuals, we might have a clearer perception of the forces governing evolution. Serious science is now so fully given up to laboratory as distinguished from field study that but little thought is given to problems of this kind. This fact makes it all the more possible for amateurs to work happily in the woods and fields, encouraged by the belief that they have innumerable discoveries still to make, countless secrets of nature still to fathom.

BIRDS AT YULE-TIDE.

I.

SUNLIGHT.

At the northern end of the wren orchard there is an angle in the stone wall where the autumn winds pile dry leaves. The wall at this point is five feet high and very thick, and no breeze finds a way through it. Above and behind the wall a dozen or more ancient white pines rise high into the air, cutting off all view of the northern sky; but southward the orchard falls away in grassy terraces, and through the vistas between the old gray trunks and tangled branches far glimpses of Cambridge and the Charles River meadows greet the eye. Christmas, 1892, had come and gone, but New Year's Day was still in the future. There were snow banks in the shadows, and back of the wall, under the pines, the north wind bustled about on winter errands. Weary with a long walk, I had sunk deep into the dry leaves on the sunny side of the wall, and had found them warm and comforting. The sun's rays had brought heat, and the brown leaves had taken it and kept it safely in their dry depths.

At first, as I lay there, the world seemed lifeless, so utterly silent was it. No insect's wing gleamed in the sunlight, no squirrel ran on the wall, no bird spoke in the treetops. There are wonderfully still moments in midsummer, when the breeze dies away, the sun's rays glow like fire in the lake, and the birds sit motionless and drowsy in the thickets. In those moments, however, the watchful eye can always see the dragon-fly darting back and forth over the water, the inch-worm reaching out its aimless and inquiring arm from the tip of a grass stalk, or the ant marching back and forth with endless patience under the stubble forests. Still and seemingly dead as was this winter morning, I had faith that if I listened attentively enough some voice would come to me out of the silence; and sure enough, as soon as my presence was forgotten, two or three golden-crested kinglets began lisping to each other in the nearest cedars. Soon they came into view, hovering, fluttering, clinging, among the evergreen branches; sometimes head downwards, often sideways, always busy clearing the foliage of its insect dwellers.

While I was watching these tiny workers, now and then catching a glimpse of their bright yellow crown-patches, I saw a much larger bird alight in a leafless ash-tree about fifty feet from me, near the orchard wall. The next moment

the harsh cry of a jay came through the still air, and as I brought my glass to bear on the visitor I expected to recognize the gay plumage of the crow's festive cousin. The bird in focus was no jay: that was clear at first glance. It was shorter than a blue jay by two inches or more; it was not blue, and its head was not crested. Presently another bird of the same species joined the first comer, and the two sat quietly in the bare tree, doing nothing. Far away a flicker called, and then in the pines the clear *phœ-bē* of the titmouse came like a whiff of perfume. One of the strange birds dropped suddenly to the foot of the tree, and began moving over a broad snow bank which lay in the shadow cast by the wall and a bunch of privet and barberry. The snow was sprinkled with the winged seeds of the ash, and the bird picked these up one by one, neatly freed each seed from its membrane, and swallowed it.

While the bird remained in shadow she looked gray; but whenever the sunlight struck her, rich olive tones glowed upon her head, back, and rump, while traces of the same coloring showed upon her breast. Beautiful water-markings rippled from her neck downward over her back. Her wings were dark ashy gray marked by two white wing bars and white edgings to the stiff feathers, and under each eye a white line was

noticeable. Her feet showed black against the snow, in which they moved regardless of cold or dampness. The bird in the tree was not favorably placed for me to see his colors, so, rising softly from my leaf-bed, I moved silently towards him until he came against a dark background. Slowly raising my glass, I leveled it upon him, and brought out to my admiring eyes the exquisite tints of his plumage. Where his mate had glowed with olive, he blushed with rosy carmine. Head, nape, rump, throat, and breast alike were suffused with warm, lustrous color. Here and there, white, gray, and ash struggled for a share in his dress, but the carmine outshone them. There could be no doubt as to the birds' identity, — they were a pair of pine grosbeaks.

My approach to a point not more than twenty feet from the feeding bird did not disturb her. She watched me closely, but continued to gather the ash seeds. At times she even ran towards me a foot or two. Suddenly a dark shadow crossed the snowdrift, and both birds started apprehensively, as though to fly away; but they quickly regained their composure as a ragged-winged crow sailed close above the treetops and disappeared behind the hill. A nearer approach to the birds showed me how massive were their bills; the upper strongly arched mandible forming a sharp hook far overhanging the blunter

under one. Their tails, too, were noticeable, being plainly and quite deeply forked.

Advancing step by step, I came at last so near these confiding birds that, had they been domestic fowls, they would have avoided me. The one on the ground flew into the ash-tree, and both moved a little higher among the branches as I walked directly beneath them. Of nervous fear they gave no sign, although both uttered short musical notes in a querulous tone. This trustfulness is characteristic of many of the migrants from the far north which suddenly, and for causes not yet fully understood, sweep over fields and forest, in midwinter. Many a time I have stood beneath a slender white birch in whose branches dozens of pine siskins were resting, or redpoll linnets feeding. I have leaned over the upper rail of a fence and looked down upon red crossbills eating salt and grain from a cattle trough on the ground on the other side of the fence, while they watched me with their bright eyes, yet did not fly. Chickadees and Hudson Bay titmice have chided me while they perched upon twigs, only a foot or two from my head; and nuthatches, kinglets, purple finches, goldfinches, and snow buntings have in a less noticeable way shown far less fear of me than any summer migrant or resident bird would display.

II.

MOONLIGHT.

Sunset in late December comes long before tea time, so I lingered in the wren orchard while the orange light came and went in the west, and until the big yellow moon swung free from the eastern elms, and began her voyage across the chilly sky. I had been worrying the crows at their roost in a grove of pitch pines on the very crest of the Arlington ridge. Just as they skulked into the grove on one side, I glided in from the other. Silently they floated through the twilight, and gained a thickly branching pine. In its upper foliage they crowded together and prepared for sleep. Then they heard my footsteps on the twigs and snow crust below, and suddenly a great stirring, and rubbing of wings and twigs told of their flight. At first they said nothing, but when they had reached the upper air they circled over the grove cawing spitefully. A small flock of pine grosbeaks dropped into the grove, and after the brightest of the golden light had faded from behind far Wachusett I heard a small troop of kinglets come in for their night's lodging. The crows came back to their favorite tree, and when I disturbed them a second time nine of them flew away full of wrath.

Leaving the pines to darkness and its birds, I came back to the wren orchard. As I ran through a savin-dotted pasture, a lonely junco flew from beneath a juniper bush, and alighted upon the ground. I stopped and watched him. For a while he kept very still, but at last he showed his white tail feathers in flight, and vanished among the cedars. Under the cedars I found a dead bird, lying on its back upon the snow. It was a grosbeak, with almost every feather, except those on the breast, intact; yet, strange to say, its body had been eaten, — probably by mice, for no creature less tiny could have removed the flesh so completely without injuring the plumage. I fear the trustfulness of this gentle migrant caused its death. Mice can eat birds, but they cannot shoot them first.

The apple-trees in the wren orchard seemed even more grotesquely gnarled as they lifted their distorted limbs against the moonlit sky than they had in the pale winter sunshine. They are very old trees for fruit trees, and many a dark cavern in their trunks and larger limbs offers shelter to owls, squirrels, and mice. Leaning against one of their broad trunks, I imitated the attenuated squeak made by a mouse. Again and again I drew breath through my tightly closed and puckered lips, feeling sure that if Scops and his appetite were in com-

pany anywhere within an owl's ear-shot of my squeaking, I should hear from the little mouser.

Once, twice, perhaps three times, there fell upon my ear what seemed like the distant wailing of a child or the faint whinnying of a horse. All at once it came over me that the sound was not distant, and I held my breath and listened intently. It came again — faint, tremulous, sad. My ears declined to say whether it came fifty feet or a quarter of a mile. I stole softly towards the point from which it proceeded, but before I had gone a rod I heard the same or a similar sound on my left. This time it was more distinct, and I knew it to be the quavering whinny of a screech owl. Stooping to the ground, I scanned the apple-trees with the white sky for a background. In the third tree from me I saw a dark lump on a branch. I crept towards it, and at the first sound I made, the bunch resolved itself into a broad-winged little owl, which flew across to the next tree. Rising, I walked straight towards it, until I stood close beneath the bird, who watched me without moving.

Although I could see only his silhouette, I knew well what his expression was like, having had several of his family as pets. His feathery ear-tufts were depressed, and his head was set down closely upon his shoulders. Could I have

seen his face, I should have met an impish glare in his small yellow eyes, and a look about his mouth suggestive of sharp bites. The screech owl fears the barred owl as much as a robin does; so when I hooted like his big cousin, and spun my hat into the air over him, he flew down almost to the ground, made a sharp angle, and rose into a tree at a little distance. After I had followed him from tree to tree for several minutes, he finally succeeded in dodging me, and I left the orchard to the quiet of the winter's night.

In the morning, when I rolled into the pile of leaves by the sunny side of the wall, the day seemed bereft of incident and color; but as I ran down the frozen hillside, hurrying more to regain warmth than to gain time, the day appeared, in retrospect, to be well filled with incident and life. Not only had there been crows, jays, flickers, chickadees, kinglets, and a junco busy about their respective tasks of food-finding, but the charming pine grosbeaks had gathered the ash seeds from the snow, a few feet from where, as soon as moonlight replaced sunshine, Scops set himself to gather his nightly harvest of mice. Vegetation, as a rule, is dormant in winter; most of the insect world selects winter for its period of repose and transformation; snow, ice, and lack of food drive certain birds

into migration, and cause reptiles and a few species of mammals to hibernate. Beyond these limits Nature keeps on her way untroubled; and even within these limits there is less stagnation than most men suppose. If man were not himself so much in dread of the snow, he would not credit the lower animals with undue fear of wintry elements.

UP THE CHIMNEY.

Lying flat upon my back on my bedroom floor, with my head in the fireplace, pillowed upon the andirons, and my gaze directed intently up the chimney, I watched, hour by hour, the strange domestic doings of two of my tenants. The fireplace was so arranged, and its opening into the chimney so shaped, that I could see much of that part of the interior of the chimney which rose above me, leading toward the little patch of blue sky far away. The whole of the west wall of the black flue and a little more than half of both the north and south walls were visible to me. The surface of these walls was rough, having been daubed with mortar which formed undulations and ridges. The lower faces of these irregularities were soft, dull black, but the parts inclined toward the sky caught the glare of light from above and shone as though ebonized. About eight feet above me, as I lay in the second-story fireplace, something about the size of half a small saucer projected like a tree fungus from the northern wall of the flue. Its edges gleamed like silvery gelatin, and light

shone through its fabric in many places. This fabric seemed to be made of dozens of small twigs matted and woven together in semi-saucer form, and held firmly in place by some translucent, gelatinous substance of a yellowish-white color. Masses of the same substance held the shallow nest in its place against the hard, cold wall of brick and mortar. Protruding from the nest were the long and slender wings of a bird, which was sitting snugly upon the structure, with her face turned directly to the bricks. The tapering wings crossed near the body, and their tips spread like a Y, under which a short, stiff, fan-shaped tail extended for a part of the distance covered by the wings. These stiff tail feathers, kept spread all the time, terminated in sharp spines, readily discernible. Occasionally, as I watched, the sitting bird wriggled on her nest, and her wings moved restlessly.

Suddenly the column of air in the chimney was thrown into vibration, and a dull booming sound resulted. Something darkened the opening of the shaft, the interrupted light trembled in a confusing way; I was strongly inclined to get out from under, and found it impossible to avoid closing my eyes. Simultaneously with these disturbing events, a bird's voice in the chimney produced a series of rapid whistling or peeping notes, so mingled as to render the hearer

uncertain as to the number of birds making them. A second bird had entered the chimney. Seen from outside, he had dropped into it, and, watched by perturbed vision from below, he had come down backward, hovering and fluttering until, head toward the light, his tiny feet had caught in the mortar, and every spine in his very brief tail had been braced against the same rough substance. Perfectly motionless, he clung to the black wall as a tree toad sticks to a tree trunk. His flat head, tiny beak, sooty brown coat, shining in the glare from the sky, did not combine well into a bird; in fact, nothing in their weird surroundings made these tenants seem akin to birds. They were more like bats.

Outside, the hot sunlight and hazy blue sky of early July hung over wood and meadow, lake and distant mountain. Butterflies fluttered and drifted in aimless flight over the sumacs, a humming bird buzzed in the deep blue larkspur flowers, barn swallows cut fanciful curves over the lake and back to their nest with its nestlings; while down in the shadowy fern land the veery's tremulous music told of coolness and comfort. How different this soot-lined tube of brick, leading down through ever-darkening gloom into an unknown abyss of blackness and silence! How strange that this keen-eyed swift, which a moment ago was speeding through highest ether at

a rate which no other bird can equal and maintain, should come back into this pit and call it his home! He spoke again, and once more the heavy air of the chimney responded to his whirring wings as he dropped a little lower to the level of the nest and turned his bright eyes inquiringly toward his mate. Her wings now moved, and she lifted herself away from the frail platform of glued twigs and stuck against the bricks a few feet distant. The male, raising his wings and keeping them moving, walked fly-like to the nest and settled upon it. Instead of facing directly toward the north wall, he sat upon the nest at a different angle, so that his forked wings projected obliquely from the nest's edge. A moment later the female made the air throb and boom to her powerful flight as she flew toward and into the light.

Twenty minutes passed; the bird on the nest was restless, and squirmed in a way which suggested physical discomfort. Then he gave a low call; and a moment later darkness, hurried notes, and the fluttering of strong wings announced the mother-bird's return. She dropped down backward until close beside the nest, struck and clung to the bricks, and then, using her feet almost as well as though on level ground, gained the nest and pushed her way upon it, fairly forcing off her mate, who seemed to have no incli-

nation to depart. Finally he moved, and, after a series of short upward flights, regained the sunlight, and was seen no more for three quarters of an hour. As the female settled herself upon the nest a faint "cheeping" suggested that tiny life was stirring beneath her breast. Her position was the same which she took in the first instance, her face being turned so directly toward the north wall that her tail projected at right angles from the nest. After seeing half a dozen exchanges in position made by the birds, I was satisfied that one parent, which I called the female, always sat straight upon the nest, and the other, which for the sake of distinguishing them I called the male, always sat obliquely.

To see only the bottom of the nest, yet to know that within it lay young swifts which were being fed in some way by their parents, was tantalizing. I recalled a former year, when I wished to secure a swift's nest with its full set of eggs, and so had kept watch of the nest; not by climbing to the chimney top and peering down, but by raising a small mirror, by whose aid I had seen the reflected nest from below. The mirror served its purpose a second time. I lashed it to the tip of a fishing rod and pushed the slender joint up the chimney, adding first the middle joint and then the but in order to bring the glass well above the nest. Something white was in the

nest — just what, I could not at first tell, for mortar dust had fallen into my eyes, and it was difficult to keep the glass still enough to see with my eyes blinking and weeping. The mother-bird had been driven from the nest by the appearance of the strange, misshapen thing which I had forced toward her from below, and she was now making short flights back and forth in the upper part of the chimney, producing sounds and sudden variations in light and darkness which would surely have frightened away any but a human intruder. Wiping my eyes and steadying the glass, I took a careful look at the contents of the nest. The white object, or at all events its whitest part, was an eggshell from whose opened halves a young bird was feebly trying to escape. Without waiting to see more, I withdrew the mirror from the chimney and removed all disturbing objects, myself included, from the fireplace. My heart reproached me. Had my violence driven the birds from their nest, thus making probable the death of the young at this trying crisis in their career? More than fifteen minutes passed before booming wings in the swift's grewsome nursery assured me that a parent had returned.

These events happened on Monday, and not until the following Saturday did I again intrude upon my batlike neighbors. Meanwhile I was

not unaware of their near presence, for at all hours of the day and night the thunder of their wings and their high-pitched voices invaded my room. After exchanging places at intervals of from fifteen to forty-five minutes all day long, it seemed to my human intelligence that they might keep still at night. But no, during evening twilight, and at ten, twelve, one, and three o'clock, and then with tenfold energy between dawn and six in the morning, they came and went, went and came, with apparently sleepless energy. The nights were clear and dry, and in the sky or over the white surface of the lake insects were probably easily seen at any hour by birds accustomed to such gloom as that of my chimney. Still it was wonderful to think of their strength and patience, and of their knowledge of place. Many if not most of us poor mortals lose our paths under the simplest conditions, even with the sun smiling down upon us, or the stars writing their ancient guideboards anew for us in the dark heavens, toward which we will not turn for aid. These swifts, however, seem to plough through darkness or light with equal confidence, cleaving the cool wind at the rate of more than a mile a minute, seeing first the pale lake below their chimney's shadow, then the vast peak of Chocorua, framed in its sombre spruces, and again some far range of untrodden mountains where

fellow swifts still nest in hollow tree trunks after the ancient practice of their family. What marvelous sense is it which brings them back by day or by night, in sunlight or in storm, straight as thought itself, to home and rest?

I never have met a man who remembered having seen a swift perch. It was formerly supposed that they had no feet, and some people still believe the fable. In building-time the birds come spinning through the air like projectiles, and while flying thus snap small terminal twigs from sycamores and other brittle trees, and carry them back to their chimneys, to be painstakingly glued into their fragile nests. After seeing my swifts use their feet so readily in getting to and from their nest, I shall not be much surprised some day to see a swift alight upon some convenient perch outside his chimney. Nevertheless, so far as is now known, the swifts take no rest even after flying many miles with incredible speed, until their accustomed shelter is regained.

When Saturday came, I felt that it was time to see more of my noisy tenants. In the intervening days something which looked like a happy thought had come to me. Why should I lie supine among the fire irons gazing up the black chimney hole, when, by judicious use of a few mirrors, I could bring the swifts and their cavern within range of my writing table? Saturday

morning the small mirror climbed the flue a second time and was firmly lashed in position a few inches above the nest. The lashing, of course, was applied to the but of the fishing rod at the point where it rested in the fireplace among andirons and tongs. Then a narrow, old-fashioned mirror, in which somebody's great-grandmother may have admired her pretty face in the days of a long-forgotten honeymoon, was gently rested upon the single stick of wood at the back of the fireplace so that its face inclined slightly toward me. Wonderful! — there were the shiny flue, the nest, the frightened bird perching far up the shaft, and the narrow line of sky above her; and there also was the small glass at the tip of my fishing rod, and in its oval face was an image of the inside of the shallow nest with two fat, featherless, sightless swifts flopping about in it. Nothing could now be easier than to watch the entire process of rearing the infant projectiles from a state of feebleness and imbecility to that marvelous condition of grace, speed, and intelligence at which, in the natural course of events, they would arrive in a few brief days.

My first desire was to ascertain how they were fed. The barn swallows, who by some freak have taken possession of a pewee's nest just under the eaves of my cottage, feed their young with insects which they bring bristling in

their beaks. I had expected to see the swifts bring insects to their babies, but my closest scrutiny failed to discover anything in their beaks when they arrived, or when they went upon the nest. Under the new conditions, I watched with double care and attention. At first, for nearly an hour, the birds were too much disturbed by the glass and fishing rod to settle upon the nest. They came close to it and chattered, but flew nervously and noisily, as though to frighten away the intruder. After a while they grew quieter, and finally one arrived with food. She came to the nest, mounted its edge, and leaned toward the open-mouthed young. Then she moved violently, and seemed to hang over the infants, to pound them, shake them, and push them back and forth in a singularly rough and unkind way. Seeing all these things by double reflection and in the dim light of the chimney, I could not be certain of details, but all that I saw reminded me of descriptions I had heard and read of feeding young birds by regurgitation, while nothing that went on looked like the quiet and matter-of-fact process of dropping a fly into a little bird's gaping mouth. It seemed to me that the parent inserted her bill in the young one's throat, and then presumably pumped into it, by the violent motions which she made, a portion of the food previously swal-

lowed by her. After being fed, the young dropped back limp or satisfied into the nest, and were promptly sat upon and hustled into a comfortable and orderly condition. Apparently both birds joined in feeding their offspring, for I saw first one and then the other go through this peculiar process.

Supposing that I should have ample opportunity for several days to watch the feeding, I did not devote myself to its study as faithfully as I should have done, had I foreseen the distressing event which was in store for my tenants. On Saturday afternoon a light rain fell. The faithful mother sat upon her nest while multitudes of tiny drops floated down the chimney. They did not fall, but seemed to sail unwillingly through the gloom, held aloft by the ascending currents of air. Each globule shone with light, and looked almost as white as a snowflake. As they approached the nest, few seemed to touch it, but curved away from it in some eddy of the air, and settled down into the depths of darkness below. During the rain both birds remained in the chimney most of the time. Sunday, July 16th, proved to be an unusually warm day, and, what was perhaps of more moment to the swifts, a very dry day, there seeming to be no moisture left in air or vegetation. About noon, while writing at my table, I heard the familiar boom-

ing, whistling, and chirping in the chimney, and as I glanced up I saw that one of the birds was coming to the nest and the other just going off up chimney. Suddenly there was a grating sound, a sharp outcry, more booming and fluttering, and I jumped to my feet and knelt before the glass to gain a closer view of the chimney. The nest had vanished. Only a tiny piece of glue adhered to the slight curve in the bricks under which the nest had been attached. The parent bird, with ruffled plumage and rapidly moving head, clung near the spot where her home had been, and seemed to me to be looking with terror far down into that horrible abyss where her young had fallen, and from which they sent back no cry. Taking down the jointed rod, I used the small mirror to search every part of the great chimney cavern which could be reached, but in vain. The nest had gone straight down without touching any fireplace, and had been lost forever in the débris and stifling dust at the bottom of the shaft.

During the remainder of the day the birds fluttered back and forth and lamented. They did not go more than two or three inches below the spot where the ill-fated nest had been. At intervals during the night I heard them moving in the chimney, but on Monday they stayed away most of the time, even during a heavy shower

which fell late in the afternoon. Toward evening I saw both of them perched near the site of their fallen home, and during that night and on other days and nights the sound of their wings occasionally came to me as a reminder of their vanished happiness. They made no effort to rebuild in my chimney, yet their presence in it seemed to show that they had not begun housekeeping elsewhere. I doubt not that another summer that love of home which is so closely connected with birds' ability to find a familiar spot by day or by night, even after months of absence, will bring my swifts back to their old flue.

THE HUMMING-BIRDS OF CHOCORUA.

WHILE snow still sparkles in the frost furrows on Chocorua's peak, the first ruby-throats appear in the warm meadows and forest glades at the south of the mountain. They love the flowers as others of their race love them, and when apple blossoms bless the air with perfume and visions of lovely color and form, the humming-birds revel in the orchards of the North as their brothers delight in the rich flowers of the tropics. It is not, however, among flowers that the Chocorua ruby-throats are happiest or most frequently seen. Were some one to ask me to find a humming-bird quickly, it would make no difference what the age of the summer or what the hour of the day, I should turn my steps toward the forest, feeling certain that at the drinking fountains of the yellow-breasted woodpecker, the red-capped tapster, and loud-voiced toper of the birch wood, I should find the ruby-throats sipping their favorite drink.

About the middle of April, and again nearly six months later, a mischievous and wary woodpecker migrates north and south across New

England. The casual observer might take him to be a demure little downy, intent upon keeping the orchard free from insects, and, if the sly migrant was ordinarily quick in placing a tree trunk between his black and white body and the observer, his identity would not be detected. On April 17, 1892, I noticed one of these birds clinging to a smooth spot on the trunk of a shagbark which grew on a warm pasture hillside in sight of Bunker Hill and the golden dome of the Massachusetts State House. Watching him carefully for a moment, I saw that he was a yellow-breasted or sap-sucking woodpecker, perhaps one of my own Chocorua neighbors, and that he was quietly sipping the sweet sap of the shagbark which was flowing from several small holes in the bark, drilled, no doubt, that very morning by the traveler so serenely occupied.

The sapsuckers reach northern New Hampshire before the snow has wholly melted in the woods. I have seen them at Chocorua, on May 1st, at work upon trees which they had evidently been tapping for fully a week. From this time until the last of September, perhaps even till the 7th or 8th of October, they spend the greater part of their time drilling small holes in the bark of their favorite trees and in sipping from the sap fountains thus opened the life blood of the doomed trees. They do not range about

through the forest tapping one tree here and another there, but they select one, two, perhaps three groups of trees well lighted and warmed by the sun, and make sap orchards of them, clinging to them many hours at a time, week after week, and returning to them, or others close at hand, year after year.

Within a mile of my cottage at the foot of Chocorua there are half a dozen of these drinking places of the yellow-breasted woodpeckers, and each one of them is a focus for ruby-throats. The one which I have known longest I discovered in 1887. It consists of a group of gray birches, springing from a single stump and expanding into fifteen distinct trunks. When I first saw it all the trees were living, and nearly all of them were yielding sap from the girdles of small drills which the woodpeckers had made in the trunks, about nine feet from the ground. In July, 1893, all but three of the trees were dead, and of the dead trunks all except two had been broken off by the wind at a point a few inches below the drills. The surviving trees had been tapped, and were in use by both sapsuckers and humming-birds. During 1890, 1891, and 1892, the humming-bird in attendance at this orchard was a male of noticeably strong character. There was no mistaking him for any chance visitor at the place. He spent all his time there,

and repelled intruders with great vigor, flying violently at them, squeaking, humming as noisily as a swarm of bees, and returning to his favorite perch as soon as they had been put to flight. He often attacked the sapsuckers themselves, buzzed in their faces, and seemed little abashed when they turned upon him, as they sometimes did, and drove him from their midst. He also had a habit of squeaking spitefully when he was drinking from the sap-wells, especially on his return from a bout with some other humming-bird. Searching for him in July, 1893, I failed to find him, but discovered that in his place a pair of birds seemed to have established themselves. Of course it is possible that my friend of previous years may have taken to himself a wife and have become mild-mannered in consequence, but I find it impossible to believe in this theory, so pronounced were the old male's temper and peculiar ways. The new male, for example, did not use the same twigs for perches, and he did not keep his head wagging from side to side as the old one did with a vigor and regularity which nothing but a pendulum ever equaled.

The new male, however, showed me a performance far more interesting in character than any of his petulant predecessor's, and one which establishes the Chocorua ruby-throat as a musician and a dancer. One day, while this male was

drinking at the sap fountains, a female arrived. The male greeted her with squeaks and intense humming. She alighted on the tree near the drills, and the male then hurled himself through the air with amazing speed, describing a curve such as would be drawn by a violently swung pendulum attached to a cord fifteen or eighteen feet long. The female was at the lowest point of the arc described by her vehement admirer, and she sat perfectly motionless while he swung past her eight times. When he moved fastest — that is, when he approached and passed her — he produced in some unknown way a high, clear, sweet, musical note, louder even than the humming which was incessant during his flight. In this first performance the male moved from north to south. A few minutes later he went through the dance a second time, describing a shorter curve and moving east and west. Still a third time, when the female had taken position in the midst of a few dense branches, the male faced her, and in a short arc, the plane of which was horizontal, flew back and forth before her. I had seen this performance once before, in July, 1890, at another orchard, and at that time I fancied that both birds took part in the flight, but in this case the birds were close above me as I lay among the ferns, and there was no difficulty in seeing clearly all that they did. During July,

1893, whenever I visited this orchard, which I call "No. 4," I found a male and a female ruby-throat in attendance upon it.

In July and August, 1890, while watching sapsuckers at what I called orchards "No. 1" and "No. 2," I found that some woodpeckers adopted an entirely different method of dealing with humming-birds from that practiced by others. At orchard No. 1, the woodpeckers drove away a humming-bird with a marked display of anger whenever one showed itself near the large red maple which was being tapped. At orchard No. 2, on the contrary, the sapsuckers allowed the ruby-throats to drink at drills a few inches from their own bills, and resented only marked impertinence on the part of their tiny visitors. At No. 1, scores of visits were paid by humming-birds every day, but they reached the drills in a comparatively small number of instances. When they did gain them they drank long and deeply, often perching upon the bark and drinking while their nervous wings were motionless. At No. 2, it seemed impossible to estimate the number of humming-birds in attendance. I went so far as to shoot a male and a female in order to feel certain that more than one pair of the tiny birds came to the drills. Nine minutes after my second crime a third humming-bird was quietly drinking at the

wells. Orchards No. 1 and No. 2 were deserted in or after 1891, their trees for the most part being dead, or so nearly dead as to be unattractive to the sapsuckers. A few rods from No. 2, a new orchard was observed by me in 1892. It may be a direct continuation of No. 2, but as all the woodpeckers at No. 2 were supposed to have been shot in 1890, the chances are that it is a new settlement. In July, 1893, twenty gray birches within an area a hundred feet square had been scarred by the woodpeckers. About half of these were dead, and out of the entire number only four trees were newly drilled and sap-yielding. In many ways this orchard proved to be the most interesting I have watched. The family of sapsuckers using it was not pugnacious, and in consequence other birds visited it much more freely than is generally the case. Downy woodpeckers occasionally sipped at its fountains; black-and-white creeping warblers regularly, though warily, visited its insect hoards, and during the autumn migration of 1892 a pair of yellow-breasted flycatchers spent many days in constant attendance upon its trees, around which countless insects fluttered or hummed.

The four sap-yielding trees at this orchard appeared in July, 1893, to have been appropriated, subject to the prior claims of the woodpeckers, by three humming-birds, a female and

two males. No one of these birds permitted either of the others or any one of numerous filibustering humming-birds to drink at its preëmpted wells. If trespass was attempted, the most furious assault was made upon the intruder, and the possessor was always victorious. Thus, if the female at the eastern tree attempted to approach the western tree, the male on guard there drove her away; while if he entered upon her dominions, he was swiftly repulsed. The details of these meetings were sometimes very extraordinary. In one instance a visiting female persisted for nearly ten minutes in trying to secure a foothold at the western tree. The savage little male met her with his usual impetuous charge, but she dodged him, and began a strange sinuous flight among the branches, back and forth, up and down, round and through, over and under, until the air seemed filled with pursued and pursuer, dizzily maintaining their mysterious flight within from five to a hundred feet of the disputed drinking place. Much of the time the female seemed to be facing the male and flying backward slowly with head erect; then there would come a swift "buzz-z-z," and a clear space between the trees would be traversed by both birds with the speed of light, a slower flight being resumed the moment foliage was entered. If the male paused in his pursuit, the

female drew near again to the coveted drills, and so forced him to renew the chase. Sometimes they moved so slowly that they seemed like bubbles or airy seed vessels wafted by the breeze, and sometimes they flew in short, ever-changing lines, so that the eye wearied of watching them. At last the female gave up the struggle and vanished above the neighboring treetops.

Frequently the visitors did not come singly, but arrived two or three together, and made combined attacks upon the drills. Then the air would be filled with violent humming and the most petulant squeaking, as the possessors hurled themselves first at one intruder and then at another, driving them back and forth, as though playing battledore and shuttlecock with them. Twice I saw the male, who defended the western tree, lock bills with a visiting female and fall almost to the ground in combat; and in several instances I noticed a hotly pursued visitor escape by suddenly doubling, seizing a twig, and then hanging head downward by one foot behind a cluster of leaves. As a rule, the ruby-throat, when drinking, makes a perfectly audible humming, the male making a sound somewhat louder and deeper than that produced by the female. It is, however, entirely within the range of their accomplishments to hover

silently, and it is not unusual for a visitor to drink silently when successful in reaching a tree unseen. While I never have seen a male ruby-throat drink from the drills while perching, I have noticed the female doing so scores of times. In fact, the female at the eastern tree perched nearly a third of the time, sometimes on a twig from which she could lean over and sip the sap, sometimes on the bark itself in a position almost identical with that taken by the woodpecker.

One morning while I was watching the new orchard, a shower came up from behind the western spurs of Chocorua. Thunder grumbled, the sky grew dark, and the wind swished viciously through the slender birches. I wondered what the birds and insects would do when the rain came. From where I sat, I could see dozens of living things, most of which were more or less dependent upon the sapsuckers' orchard. There were four of the woodpeckers themselves, three humming-birds, a hermit thrush, two juncos, three chickadees, a least flycatcher; five or six butterflies representing three species; hornets and numbers of flies, ants, and other small insects. As the rain began, the insects, with the exception of the hornets, vanished at once. All the birds, save one of the woodpeckers and the ruby-throats, flew out of sight. The remaining

sapsucker was a young bird, who looked stupid, and who received the rain by ducking his head and vibrating his tail and wings as a bird does when he bathes in a pool. But the ruby-throats amazed me by their conduct. They sought leafless twigs with only the weeping sky above them, and there, apparently with joy, extended their wings to the fullest extent, spread their tails until every feather showed its point, and then received the pelting, pounding rain as though it were holy water. They became so wet that I doubted whether they could fly. *Buzz-z-z!* the vigilant male darted at an intruding female and drove her out of sight, only to see her return again and again in the thickest of the white drops in vain attempts to overcome his watchfulness. It was evident that no ordinary shower could interfere with the whirring wings of a humming-bird.

As the season of 1893 wore on, the number of humming-birds at this orchard diminished. Late in July I saw not fewer than five birds near the trees at one moment, three of them being regular attendants and two interlopers. During the next four weeks I was absent, but on my return, I found that only the female using the eastern tree remained, and that she was seldom annoyed by visitors. The trees which had been used by the other two birds had run dry, and the

sapsuckers as well as their uninvited guests had abandoned them. Of the identity of the remaining humming-bird there could be no question; her ways were too strongly marked to be mistaken, as, for example, her invariable habit of alighting upon one slightly sloping trunk when she drank from its drills. When September drew near I watched closely to ascertain the date of the little lady's departure, but day after day came and went without my missing her. At last, on September 1st, it seemed to me that she had gone. I had waited ten or fifteen minutes by the trees and she had not come, though the sapsuckers were busy at the drills in their accustomed places. Before finally giving her up I thought that I would count a hundred slowly and see if this form of incantation might not draw her to her trees. When I reached "ninety-nine" and no bird came, I concluded that the exact date of her migration had been found, but as I said "one hundred" there was a faint hum in the still air, and the dainty dipper appeared with her usual sprightliness. On the 6th, after several light frosts had laid their chilly touch upon the Chocorua country, I felt confident that the tiny creature must have sought a kinder climate. Again, however, she surprised me by appearing, after a long delay, as bright as ever. She hummed at her regular drinking places, but

seemed to find little moisture in the wasting fountains. The trees were losing vitality and becoming dry. Then she sought the dead twigs at the tops of last year's trees and flitted back and forth among them, sunning herself. No perch pleased her long, and when she wearied of them all she darted back to the drills for a brief perfunctory sip of the slow-moving sap. Her restlessness seemed born of the season, and a symptom of that fever of migration which was making all bird-life throb more and more quickly.

Although on September 25th, when I made my last visit of the year to the orchard, I found two sapsuckers still at work at the drills, no humming-bird was with them. How long after the 6th the vigorous little female remained I do not know, for I was unable to watch the trees during the middle of the month.

Although at Chocorua I never have found a sapsuckers' orchard without its attendant humming-birds, I am by no means sure that in other localities where both birds occur the same community of interests is to be detected. During a brief visit to Cape Breton in midsummer, 1893, I kept close watch for sapsuckers and humming-birds. Of the latter, not one came under my eyes, although common testimony was that they frequented the country. Of the sapsuckers I found one flourishing colony among the alders

which bordered the southwest Margaree at the point where that swift stream emerges from Loch Ainslie. More than a dozen alder trunks had been girdled with drills and a rich orchard seemed to be in use. I had not long to wait at the spot, but in the fifteen minutes which I could spare no humming-birds came to reward my silent watching.

In some parts of the country sapsuckers are roughly treated on account of their destruction of trees. It is unquestionably true that each family of birds kills one or more vigorous trees each year, but generally the trees are small and of trifling value as timber. My sapsuckers are welcome to several forest trees a year, so long as they continue to attract and feed humming-birds, and indirectly to draw thousands of insects within easy reach of their own bills and the more active mandibles of flycatchers, warblers, and vireos.

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